

TRANSPORTATION CABINET

Frankfort, Kentucky 40622 www.kentucky.gov

RECEIVED

NOV 1 3 2006

WATER QUALITY CERTIFICATION SECTION

AI #756 33

Bill Nighbert Secretary

Marc Williams
Commissioner of Highways

November 8, 2006

Division of Water Water Quality Certification Section Attn: Jenni Garland, Supervisor 14 Reilly Road Frankfort, Kentucky 40601

SUBJECT: Section 401 - Water Quality Certification

Madison County, Item No. 7-192.20

Berea Bypass, Section 2

Dear Ms. Garland:

Ernie Fletcher

Governor

Submitted is an application for a Water Quality Certification for the above referenced project. This project concerns the construction of 4.6 miles of the Berea Bypass, from US25 to KY21. An application has been submitted to the Louisville District, Corps of Engineers, for consideration of a Nationwide Permit. The project will involve the construction of one new bridge and a bridge replacement over Silver Creek, the placement/replacement of several culverts, and impacts to ten small wetland areas.

There are crossings involving eleven blue-line streams. Seven crossings have stream impacts over 200' in length (Sites 5, 6, 10, 14, 19, 21, 30), but only three (Sites 10, 21, 30) have impacts over 200' in a watershed greater than 250 acres. Mitigation for those three impact sites will be handled by payment of an in-lieu fee. The wetland impacts, individually or collectively, are less than one acre; so mitigation is not required.

Enclosed find a completed application, vicinity map, plans and drawings of each impact site, and stream assessments for the three sites requiring mitigation. If you have any questions, please contact Roy Collins at (502) 564-7250.

Sincerely

Roy C/Collins, III
Permits Coordinator

Division of Environmental Analysis

Enclosures

Cc: James Ballinger Phil Logsdon Dave Heil Roy Collins Files



COMMONWEALTH OF KENTUCKY NATURAL RESOURCES & ENVIRONMENTAL PROTECTION CABINET DEPARTMENT FOR ENVIRONMENTAL PROTECTION DIVISION OF WATER

APPLICATION FOR PERMIT TO CONSTRUCT ACROSS OR ALONG A STREAM AND / OR WATER QUALITY CERTIFICATION

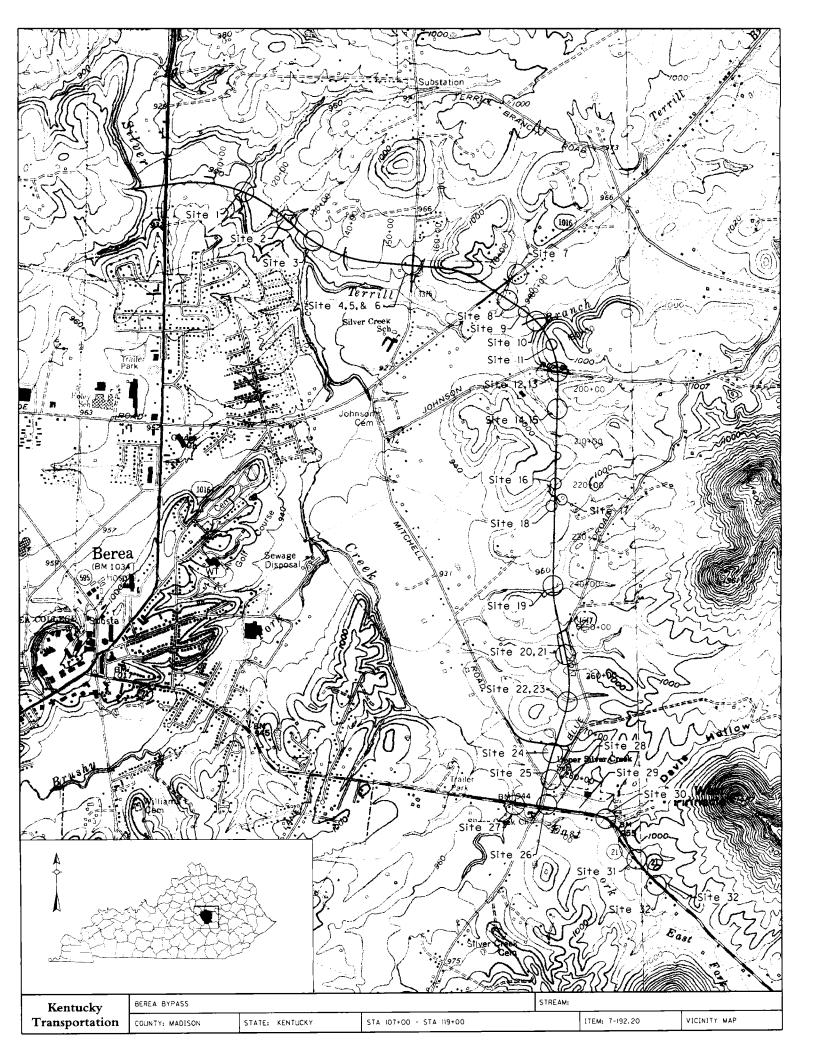
Chapter 151 of the Kentucky Revised Statutes requires approval from the Division of Water prior to any construction or other activity in or along a stream that could in any way obstruct flood flows or adversely impact water quality. If the project involves work in a stream, such as bank stabilization, dredging or relocation, you will also need to obtain a 401 Water Quality Certification (WOC) from the Division of Water. This completed form will be forwarded to the Water Quality Branch for WQC processing. The project may not start until all necessary approvals are received from the KDOW. For questions concerning the WQC process, contact John Dovak at 502/564-3410.

If the project will disturb more than 1 acre of soil, you will also need to complete the attached Notice of Intent for Storm Water Discharges, and return both forms to the Floodplain management Section of the KDOW. This general permit will require you to create and implement an erosion control plan for the project.

1.	OWNER: Kentucky Transportation Cabinet, Division of Environmental Analysis								
		r of proposed project.							
	MAILING ADDRESS:	200 Mero Street, 5 th Floor		RECEIVED					
		Frankfort, KY 4062	2		NOV 1 9 2000				
	TELEPHONE #: 50	2-564-7250	EMAIL:		NOV 1 3 2006				
2.		ins, III; Permit Coordin	ator		WATER QUALITY CERTIFICATION SECTION				
	Give name of person(s) submitting application, if other than owner.								
	ADDRESS: Same as a	bove							
	TELEPHONE #:502	2-564-7250	EMAIL:	RoyC.Collins@ky.gov					
3.	ENGINEER:								
	Contact Division	Contact Division of Water if waiver can be granted							
	TELEPHONE #:		EMAIL:						
4.	DESCRIPTION OF CONSTRUCTION: This project concerns the construction of 4.6 miles of the Berea Bypass, from US25 Describe the type and purpose of construction and describe stream impact								
	to KY21. It requires two new bridges over Silver Creek, the placement/replacement of numerous culverts, and will impact								
	several small wetland areas. There are eleven "blue-line" streams that will be crossed. Seven sites involve impacts greater								
	than 200' in length, but only three sites should require mitigation (drainage areas greater than 250 acres). The wetland								
	Impacts do not exceed 1.0 acres (individually or collectively), so wetland mitigation should not be required.								
5.	COUNTY: Madison		NEAREST COM	MUNITY: Berea					
6.	USGS QUAD NAME:	Berea	LATITUI	DE/LONGITUDE: N3	7-35-38, W84-15-25 (Site 10)				
7.	STREAM NAME: S	ilver Ck., East Fork, an	d UT's WATERS	HED SIZE (in acres):	897 (#10), 289 (#21), 489 (#30)				
8.	LINEAR FEET OF ST	LINEAR FEET OF STREAM IMPACTED: Site 10 –256', Site 21-437', Site 30-304'							
9.	DIRECTIONS TO SITE: Traveling south on I-75 from Lexington, take Exit 76 to head east on KY21. Proceed east for								
	Approximately 2.7 miles to the KY21/KY1617 (Blue Lick Road) intersection. This is the ending point for the Bypass. Around								
		1 mile of KY21 will be reconstructed in this area. To follow the Bypass construction, process north from the intersection over-							
		and have its beginning point							
	at US25 near its crossing								

	ION OF THE REQUESTED PROJECT NOW COMP tion on the drawings you submit and indicate the dat							
•	BEGIN CONSTRUCTION DATE:							
	END CONSTRUCTION DATE:	May 2009						
HAS A PERM a copy of that	HAS A PERMIT BEEN RECEIVED FROM THE US ARMY CORPS OF ENGINEERS? Yes No If yes, attach a copy of that permit. Nationwide Permit Application has been submitted.							
THE APPLIC	CANT MUST ADDRESS PUBLIC NOTICE							
(a)	Public notice in newspaper having greatest circu	ılation in area (provide newspaper clipping or affadavit)						
	Adjacent property owner(s) affadavits (Contact Division of Water for requirements.)							
(b)	I REQUEST WAVER OF PUBLIC NOTICE B	ECAUSE: This is a state project, public meetings and notices						
3.114	NTACTED THE FOLLOWING CITY OR COU	NTY OFFICIALS CONCERNING THIS PROJECT:						
N/A Give	name and title of person(s) contacted and provide	copy of any approval city or county may have issued.						
LIST OF AT	TACHMENTS:							
	List plans, profiles, or other d	rawings and data submitted. Attach a copy of a 7.5 minute						
	USGS topographic map clearly showing the project location. Vicinity Map, Plans and drawings for each impact site							
	Vicinity Map, Plans a	nd drawings for each impact site						
		in/floodway Analysis						
		ent Sheets, Wetland Report						
	Mitig	ation Discussion						
ī	(owner) CERTIFY THAT THE OWNER OW	NS OR HAS EASEMENT RIGHTS ON ALL PROPERTY						
.,		ON WHICH RELATED CONSTRUCTION WILL						
OCCUR (for	dams, this includes the area that would be impo	inded during the design flood).						
REMARKS:	This project is exempt	from the provisions of KRS 151.250.						
I hereby i	ing documents. To the best of my knowledge, all	771						
	Owner or Agent sign here.	(If signed by Agent, a Power of Attorney should be attached.)						
	DATE: 11/8/06	_						
	SIGNATURE OF LOCAL FLOODPLAI	N COORDINATOR:						
	Permit application will be returned to a	applicant endorsed by the local floodplain coordinator.						
	DATE:							
	SUBMIT APPLICATION AND ATTAC	HMENTS TO:						

Floodplain Management Section Division of Water 14 Reilly Road Frankfort, KY 40601



SUMMARY OF SECTION 404 IMPACTS

Item No. 7-192.20

(All stations are Mainline unless otherwise indicated; also note that no Special Aquatic Site were found on this project)

- 1. Sta. 115+25 Construct a six span bridge over Silver Creek (Reach 2), a **perennial** stream. **No permanent impact** to the waters is anticipated. A temporary low-water crossing may be utilized during construction (a typical drawing is enclosed). The crossing and pipe openings will be configured to pass a 2-year storm without overtopping, checked for a 5-year to assure that no increase in the water surface will damage adjoining property, and the disturbed area will be returned to pre-construction contours. The drainage area affected is **22.13 sq.mi**. This site is located at N37-35-57, W84-16-39. (Nationwide Permit No. 33)
- 2. Sta. 126+21 Construct 177' of pipe culvert, with 20' of inlet and 32' of outlet channel improvements; on an **ephemeral/perennial** tributary (Reaches 4US and 4DS, respectively) to Silver Creek. Additionally, fill an **ephemeral** tributary (Reach 5) and a 0.04 acre wetland (Wetland A). This replaces 259' of ephemeral and 171' of perennial channel. The impact to waters 0.04 acres of wetlands, 0.003 acres of ephemeral and 0.012 acres of perennial. The drainage area affected is 74.4 acres. The site is located at N37-35-51, W84-16-29. (Nationwide Permit No. 14)
- 3. Sta. 134+65 Construct 202' of pipe culvert, with 25' of inlet and 30' of outlet channel improvements; on an **ephemeral** tributary (Reach 6) to Silver Creek. This replaces 311' of existing channel. The impact to waters is 0.003 acres. The drainage area affected is 23.0 acres. The site is located at N37-35-46, W84-16-19. (Nationwide Permit No. 14)
- 4. Sta. 154+40 Construct 176' of pipe culvert, with 270' of inlet and 219' of outlet channel improvements; on an **ephemeral** tributary (Reach 11) to Terrill Branch. This replaces **584'** of existing roadside channel. The impact to waters is **0.007 acres**. The drainage area affected is **11.5 acres**. The site is located at N37-35-39, W84-15-57. (Nationwide Permit No. 14)
- 5. Right Sta. 155+16.47 (KY 3376, Sta. 7+47) Construct 153' of 8'X 4' box culvert, with 10' of inlet and 40' of outlet channel improvements; on a **perennial** tributary (Reach 12 DS) to Terrill Branch. This replaces **243'** of existing channel (including 25' of existing box culvert). The impact to waters is **0.022 acres**. The drainage area affected is **127.2 acres**. The site is located at N37-35-39, W84-15-57. (Nationwide Permit No. 14, WQC)
- 6. Sta. 157+43 Construct 209' of 8'X 4' box culvert, with 10' of inlet and 40' of outlet channel improvements; on a **perennial** tributary (Reach 12US) to Terrill Branch. This replaces **271'** of existing channel. The impact to waters is **0.019 acres**. The

- drainage area affected is **109.8 acres**. The site is located at N37-35-40, W84-15-54. (Nationwide Permit No. 14, WQC)
- 7. Left Sta. 173+46 (KY 1016, Sta. 14+26) Construct a 46' upstream and a 28' downstream extension on an existing 9'X 4' box culvert; with a 10' inlet and a 45' outlet channel improvement. This is on a **perennial** tributary (Reach 15US) to Terrill Branch. This replaces 135' of existing channel. The impact to waters is 0.009 acres. The drainage area affected is 102.6 acres. The site is located at N37-35-38, W84-15-31. (Nationwide Permit No. 14)
- 8. Sta. 176+36 Construct 132' of 10'X 4' box culvert, with 10' of inlet and 20' of outlet channel improvements; on a **perennial** tributary (Reach 15DS) to Terrill Branch. This replaces **184'** of existing channel. The impact to waters is **0.014 acres**. The drainage area affected is **123.3 acres**. The site is located at N37-35-34, W84-15-32. (Nationwide Permit No. 14)
- 9. Right Sta. 179+00 Drain an **isolated 0.068 acre pond**, and fill **0.039 acres**. The drainage area affected is **3.0 acres**. The site is located at N37-35-32, W84-15-29. (Non-jurisdictional)
- 10. Sta. 183+97 Construct 167' of double box culvert, with 20' of inlet and 30' of outlet channel improvements; on Terrill Branch (Reach 16), a **perennial** stream. This replaces **256'** of existing channel. The impact to waters is **0.029 acres**. The drainage area affected is **897.4 acres**. The site is located at N37-35-38, W84-15-25. (Nationwide Permit No. 14, WQC)
- 11. Sta. 190+00 Drain and fill a **0.042 acre pond**, with **0.03 acres of wetlands** (Wetland B) and fill an **ephemeral** tributary (Reach 17) to Terrill Branch. This replaces the wetlands and **96'** of existing channel. The impact to waters is **0.03 acres** of wetlands and **0.001 acres** of ephemeral channel. The drainage area affected is **2.2 acres**. The site is located at N37-35-24, W84-15-21. (Nationwide Permit No. 14)
- 12. Left Sta. 194+00 to Right Sta. 195+93, and Left Johnson Shop Rd. Sta. 7+50 to Sta. 12+75 Construct 84' of pipe culvert (Sta. 10+61, Johnson Shop Rd.), with 150' of inlet and 110' of outlet channel, ending at the inlet of the culvert at Sta. 197+81 (described below). This replaces 229' of ephemeral tributary (Reach 18) and 529' of an ephemeral roadside drainage channel (Reach 19) along Johnson Shop Road; which runs to a tributary of Terrill Branch. The total impact to waters is 0.011 acres (0.005 acres and 0.006 acres respectively). The drainage area affected is 3.4 acres. The site is located at N37-35-19, W84-15-19. (Nationwide Permit No. 14)
- 13. Sta. 197+81 Construct 119' of pipe culvert, with 15' of inlet and 15' of outlet channel improvements; on an **ephemeral** tributary (Reach 20) to Terrill Branch. This replaces 166' of existing channel. The impact to waters is 0.004 acres. The drainage area affected is 21.0 acres. The site is located at N37-35-17, W84-15-19. (Nationwide Permit No. 14)

- 14. Sta. 205+90 Construct 162' of 8'X 4' box culvert, with 20' of inlet and 20' of outlet channel improvements; on a **perennial** tributary (Reach 21) to Terrill Branch. This replaces **241'** of existing channel. The impact to waters is **0.028 acres**. The drainage area affected is **132.8 acres**. The site is located at N37-35-09, W84-15-20. (Nationwide Permit No. 14, WQC)
- 15. Sta. 207+60 Fill **160'** of **ephemeral** tributary (Reach 22) to Terrill Branch. The impact to waters is **0.004 acres**. The drainage area affected is **1.0 acres**. The site is located at N37-35-07, W84-15-19. (Nationwide Permit No. 14)
- 16. Sta. 218+35 Construct 237' of pipe culvert, with 20' of inlet and 20' of outlet channel improvement; on an **ephemeral** tributary (Reach 23) to Silver Creek. Additionally, place 32' of private entrance pipe downstream (no drawing). This replaces 320' of existing channel. The impact to waters is 0.007 acres. The drainage area affected is 16.9 acres. The site is located at N37-34-55, W84-15-21. (Nationwide Permit No. 14)
- 17. Left Sta. 222+00 Drain an **isolated 0.134 acre pond**, with **0.020 acres of wetlands** (Wetland C). No connectivity with another water source was identified in the field. The drainage area affected is **0.4 acres**. The site is located at N37-34-52, W84-15-18. (Non-jurisdictional)
- 18. Right Sta. 224+50 Drain an isolated 0.049 acre pond, with 0.020 acres of wetlands (Wetland D). No connectivity with another water source was identified in the field. The drainage area affected is 0.2 acres. The site is located at N37-34-51, W84-15-21. (Non-jurisdictional)
- 19. Sta. 241+04 Construct 115' of double 6'X 5' box culvert, with 180' of inlet and 20' of outlet channel improvements; on a **perennial** tributary (Reach 26) and **intermittent** tributary (Reach 27) to Silver Creek. This replaces 348' of perennial and 50' of intermittent channel. The total impact to waters is 0.041 acres (0.036 acres and 0.005 acres, respectively). The drainage area affected is 219.1 acres. The site is located at N37-34-34, W84-15-20. (Nationwide Permit No. 14, WQC)
- 20. Sta. 250+50 Fill a **0.20 acre wetland** (Wetland E) associated with drainage to a tributary of Silver Creek. The drainage area affected is **6.0 acres**. The site is located at N37-34-25, W84-15-22. (Nationwide Permit No. 14)
- 21. Sta. 253+14 Construct 262' of double 8'X 5' box culvert, with 10' of inlet and 45' of outlet channel improvements; on a **perennial** tributary (Reach 29) to Silver Creek. Additionally, drain and fill a **0.068 acre pond** with **0.02 acres of wetlands** (Wetland F). This replaces **437**' of perennial channel and **70**' of **ephemeral** channel (assumed length through pond) and the wetlands. The impact to waters is **0.050 acres** of perennial, **0.002 acres** of ephemeral, and **0.020 acres of wetlands**. The drainage

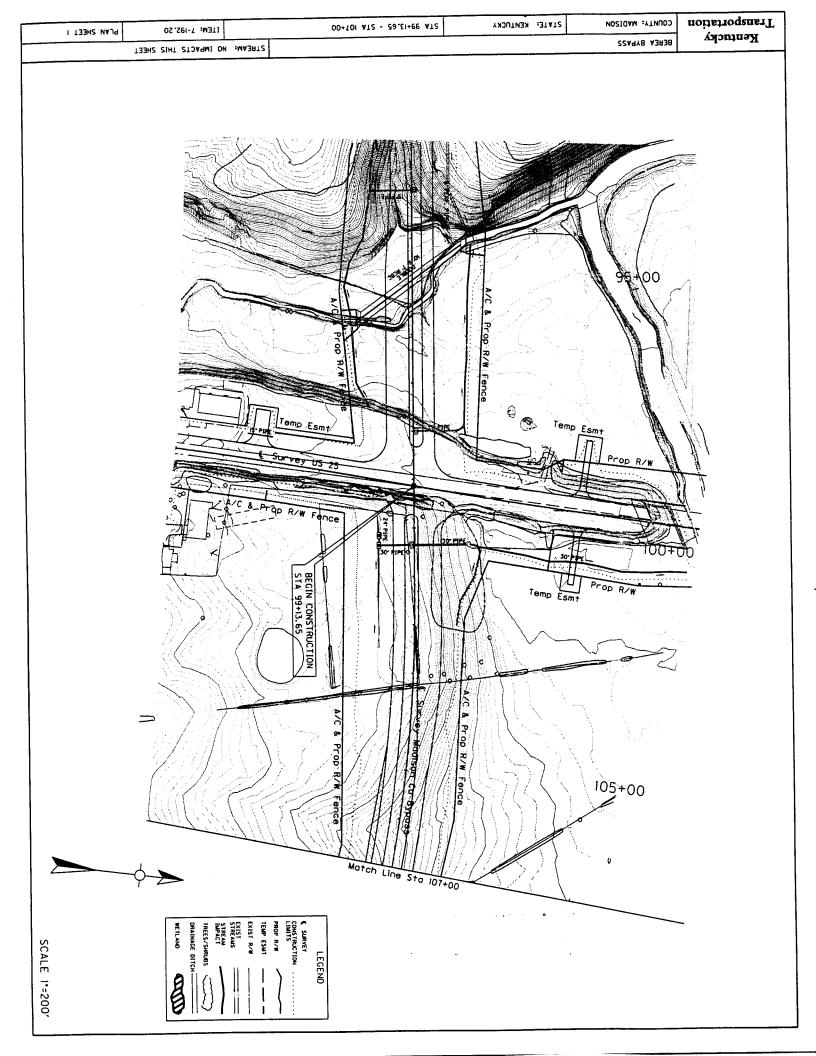
- area affected is **288.6 acres**. The site is located at N37-34-23, W84-15-18. (Nationwide Permit No. 14, WQC)
- 22. Sta. 264+31 Construct 106' of pipe culvert, with 15' of inlet and 20' of outlet channel improvements; on an **intermittent** tributary (Reach 30) to Silver Creek. This replaces 169' of existing channel. The impact to waters is 0.008 acres. The drainage area affected is 24.8 acres. The site is located at N37-34-11, W84-15-18. (Nationwide Permit No. 14)
- 23. Sta. 265+00 Fill a **0.09 acre wetland** (Wetland G) associated with drainage to a tributary to Silver Creek. The drainage area affected is **7.3 acres**. The site is located at N37-34-10, W84-15-17. (Nationwide Permit No. 14)
- 24. Sta. 276+70 Construct 115' of pipe culvert, with 15' of inlet and 15' of outlet channel improvements, on an **ephemeral** tributary (Reach 33) to Silver Creek. This replaces **199'** of existing channel. The impact to waters is **0.005 acres**. The drainage area affected is **37.8 acres**. The site is located at N37-34-00, W84-15-22. (Nationwide Permit No. 14)
- 25. Left Sta. 281+70 Fill an **isolated pond** that is a **0.03 acre wetland** (Wetland H). No connectivity with another water source was identified in the field. The drainage area affected is **0.06 acres**. The site is located at N37-33-55, W84-15-23. (Non-jurisdictional)
- 26. Left Sta. 283+20 to Left Sta. 290+00 Construct 124' of pipe culvert (KY21 Sta. 116+88.58), with 385' of inlet and 221' of outlet channel improvement; on an **ephemeral/intermittent** tributary (Reaches 34US and 34DS, respectively) to East Fork Silver Creek. Additionally, fill another **ephemeral** tributary (Reach 40) which runs along KY21 (KY21 Sta. 116+75 to Sta. 118+50). This replaces 642' of existing ephemeral and 253' of existing intermittent channel. The impact to waters is 0.023 acres (0.013 acres of ephemeral and 0.011 acres of intermittent). The drainage area affected is 35.4 acres. The site is located at N37-33-49, W84-15-25. (Nationwide Permit No. 14)

KY-21 Impacts

(Stations are left and right of Mainline Sta. 287+62.3)

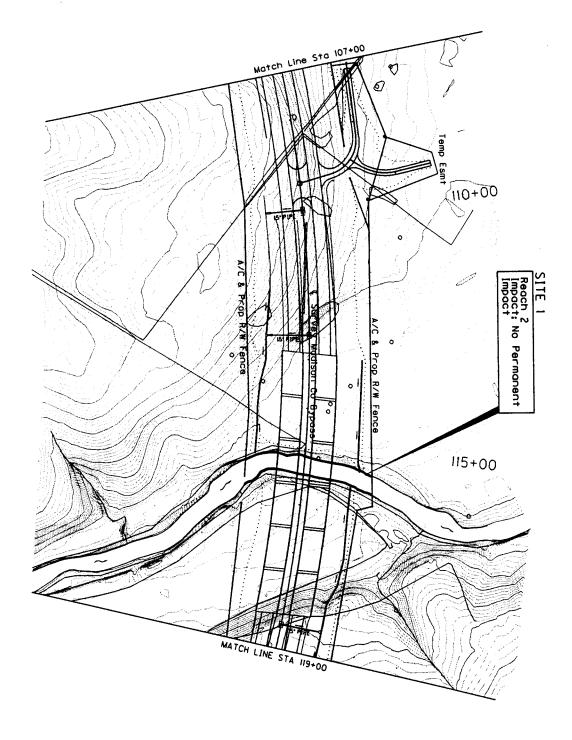
27. Sta. 110+30 - Construct an 80' single span bridge at Silver Creek (Reach 39), a **perennial** stream. This replaces an existing bridge with 2-35' spans. The impact to waters is **0.037 acres**. A temporary low-water crossing may be utilized during construction (a typical drawing is enclosed). The crossing and pipe openings will be configured to pass a 2-year storm without overtopping, checked for the 5-year to assure that no increases in the water surface will damage adjoining property, and the disturbed area will returned to pre-construction contours. The drainage area affected

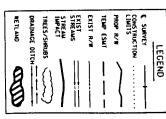
- is **8.2 sq.mi**. The site is located at N37-33-50, W84-15-32. (Nationwide Permit No. 14)
- 28. Left Sta. 119+25 Fill an **isolated 0.05 acre wetland** (Wetland I). No connectivity with another water source was identified in the field. The drainage area affected is **7.2 acres**. The site is located at N37-33-19, W84-15-23. (Non-jurisdictional)
- 29. Left Sta. 124+60 Fill a **0.01 acre wetland** (Wetland J), connected to a roadside drainage channel for KY-21. The drainage area affected is **0.30 acres**. The site is located at N37-33-48, W84-15-15. (Nationwide Permit No. 14)
- 30. Sta. 129+75 Construct 101' of 18'X 4' box culvert, with 90' of inlet and 35' of outlet channel improvements; on Davis Hollow, a **perennial** tributary (Reaches 42US and 42DS) to East Fork Silver Creek. Additionally, construct 65' of new channel for an **ephemeral** tributary (Reach 43). This replaces **304**' of perennial channel (including 64' of existing culvert) and **80'** of ephemeral channel. The total impact to waters is 0.037 acres (**0.035 acres** of perennial and **0.002 acres** of ephemeral). The drainage area affected is **489.4 acres**. The site is located at N37-33-46, W84-15-09. (Nationwide Permit No. 14, WQC)
- 31. Sta. 140+80 Construct 123' of pipe culvert, with 30' of outlet channel improvement; on an **intermittent** tributary (Reach 45) of East Fork Silver Creek. This replaces 173' of existing channel (including 39' of existing culvert). The impact to waters is 0.006 acres. The drainage area affected is 50.2 acres. The site is located at N37-33-37, W84-15-01. (Nationwide Permit No. 14)
- 32. Sta. 147+82 Fill two **ephemeral** tributaries (Reaches 47 and 48) of East Fork Silver Creek. Flow will be redirected via 700' of roadside channel to the culvert at Sta. 140+80. This replaces 206' of existing channel (112' and 94' respectively). The total impact to waters is **0.002 acres**. The drainage area affected is **5.6 acres**. The site is located at N37-33-32, W84-14-55. (Nationwide Permit No. 14)

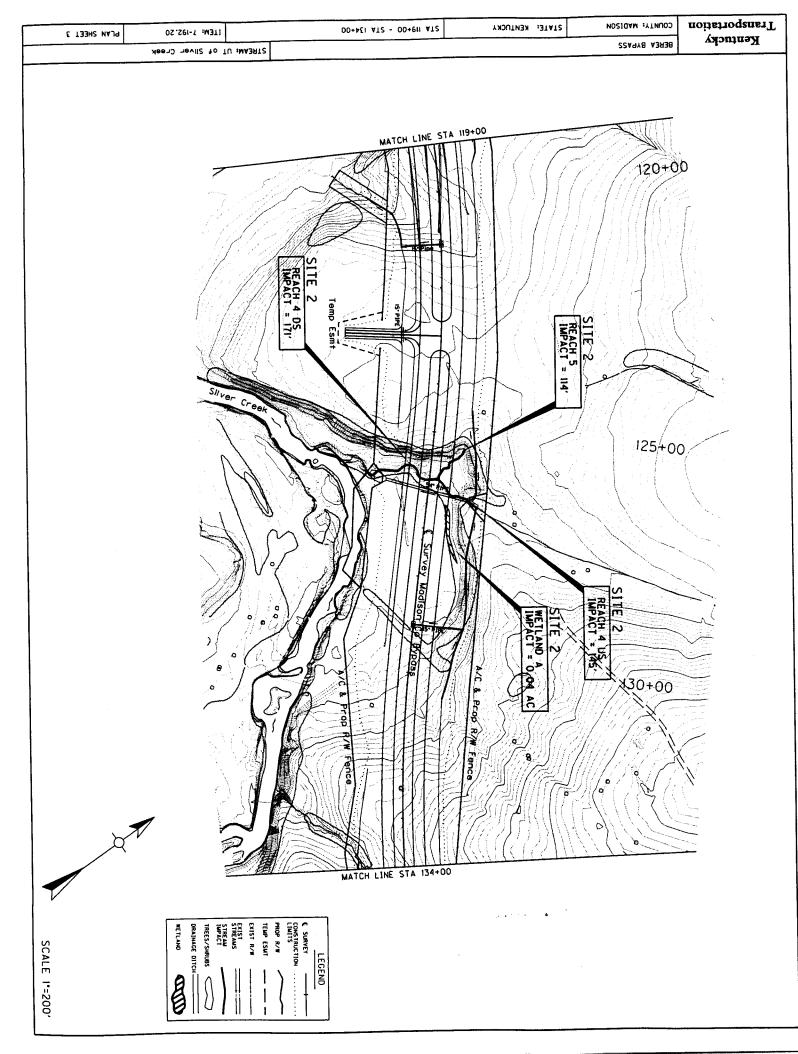


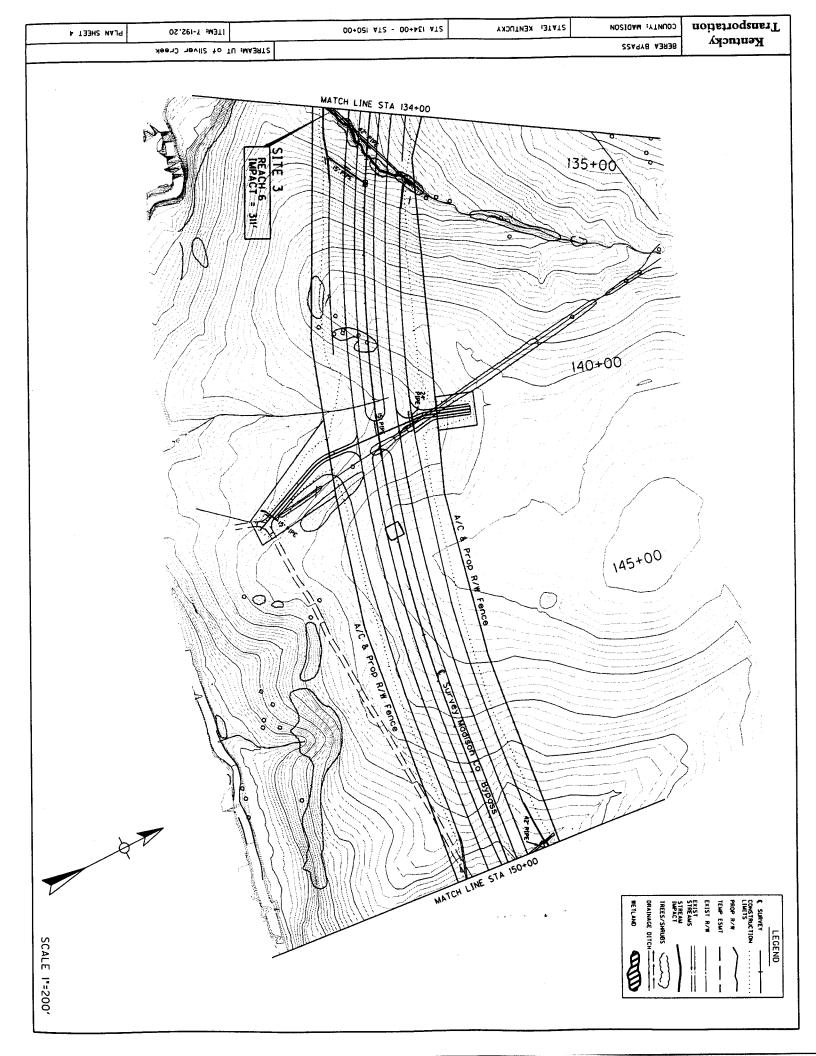
Kentucky
Transportation

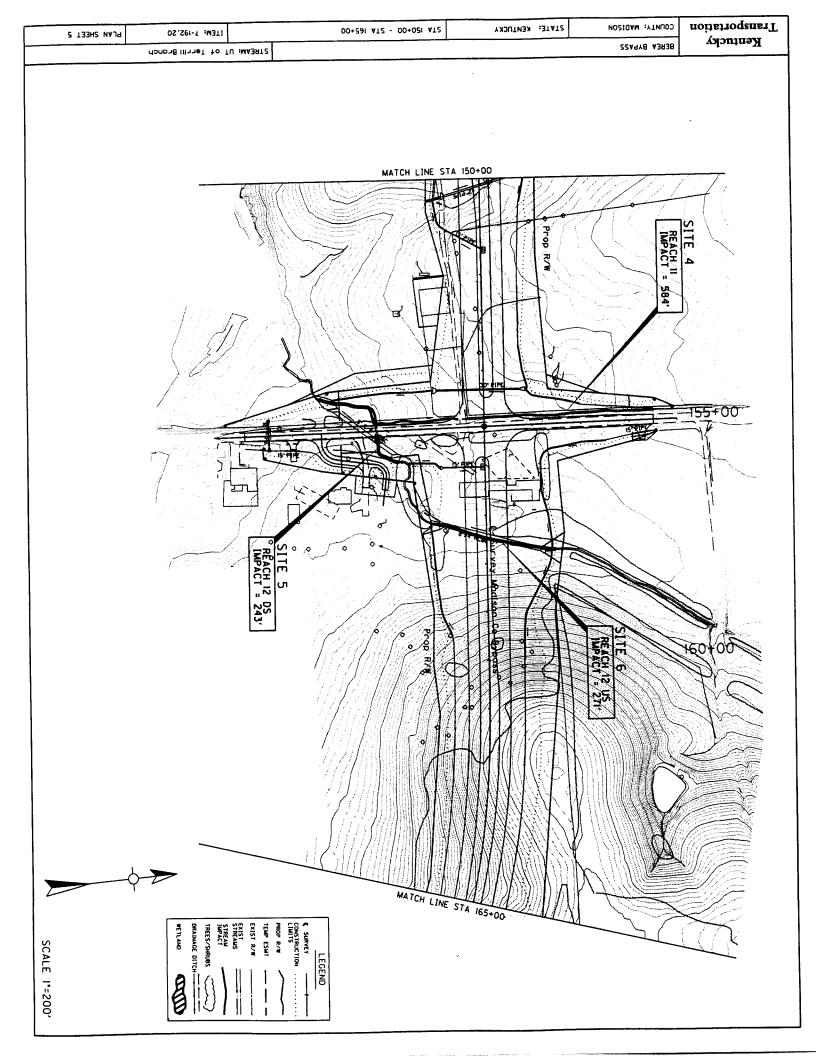
| Kentucky | Stress | S

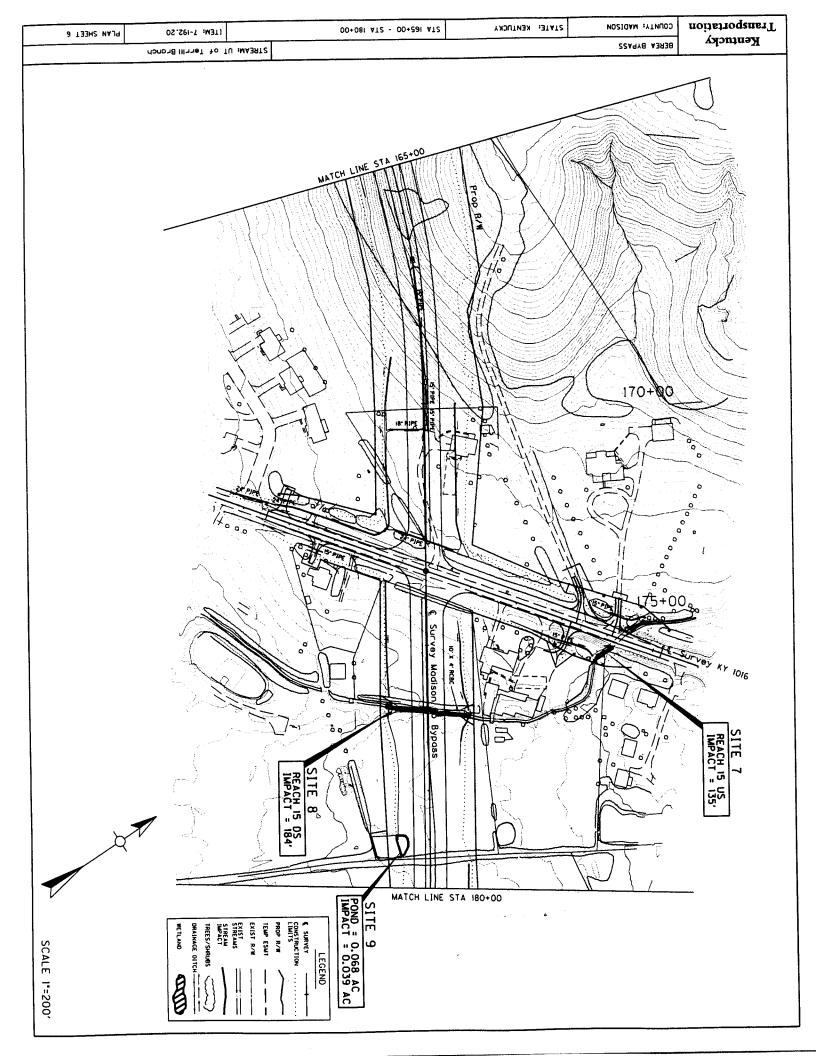


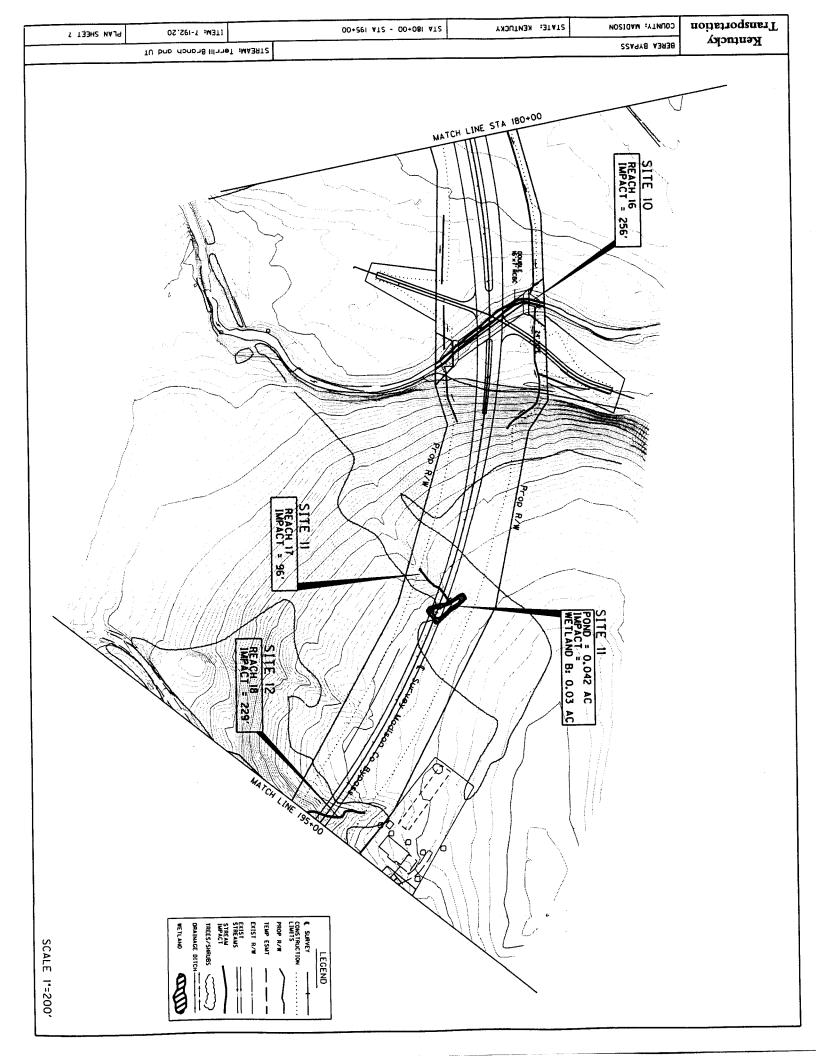


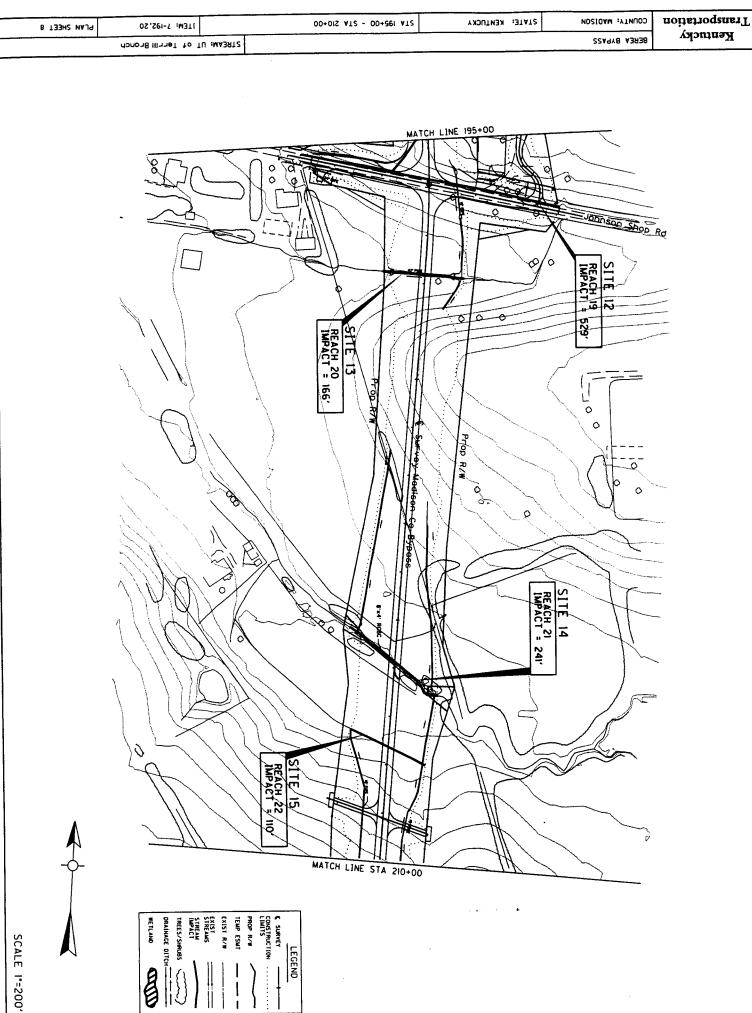


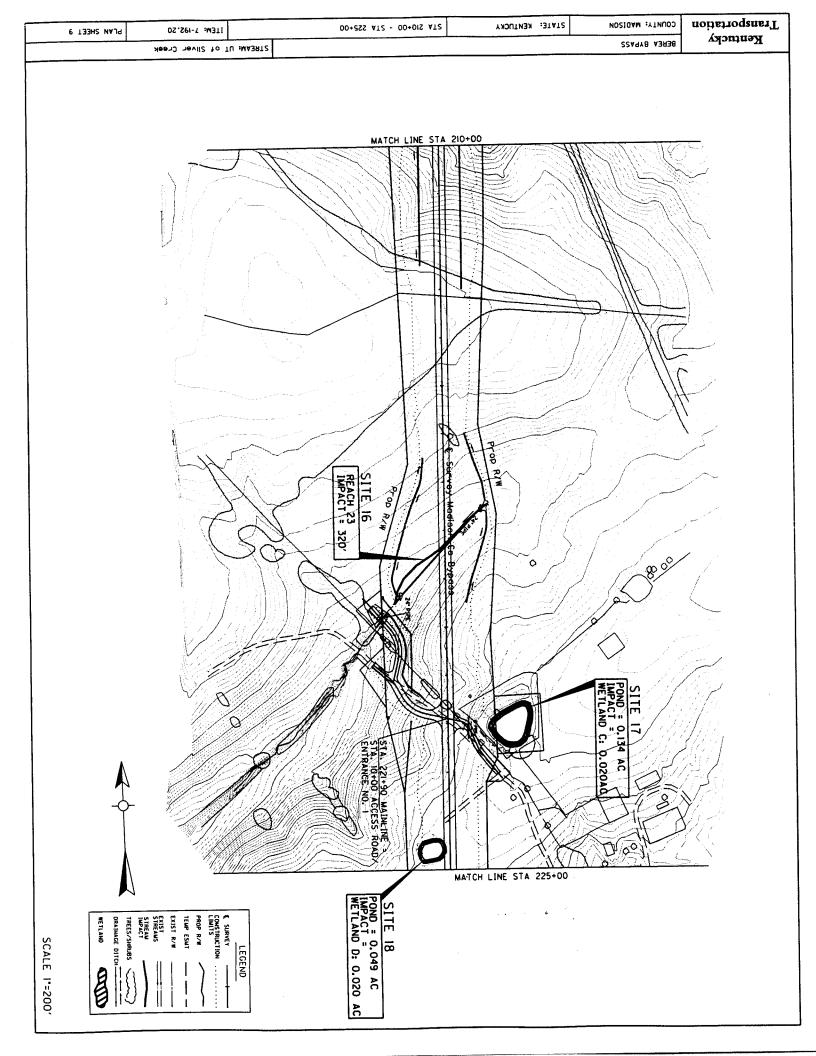


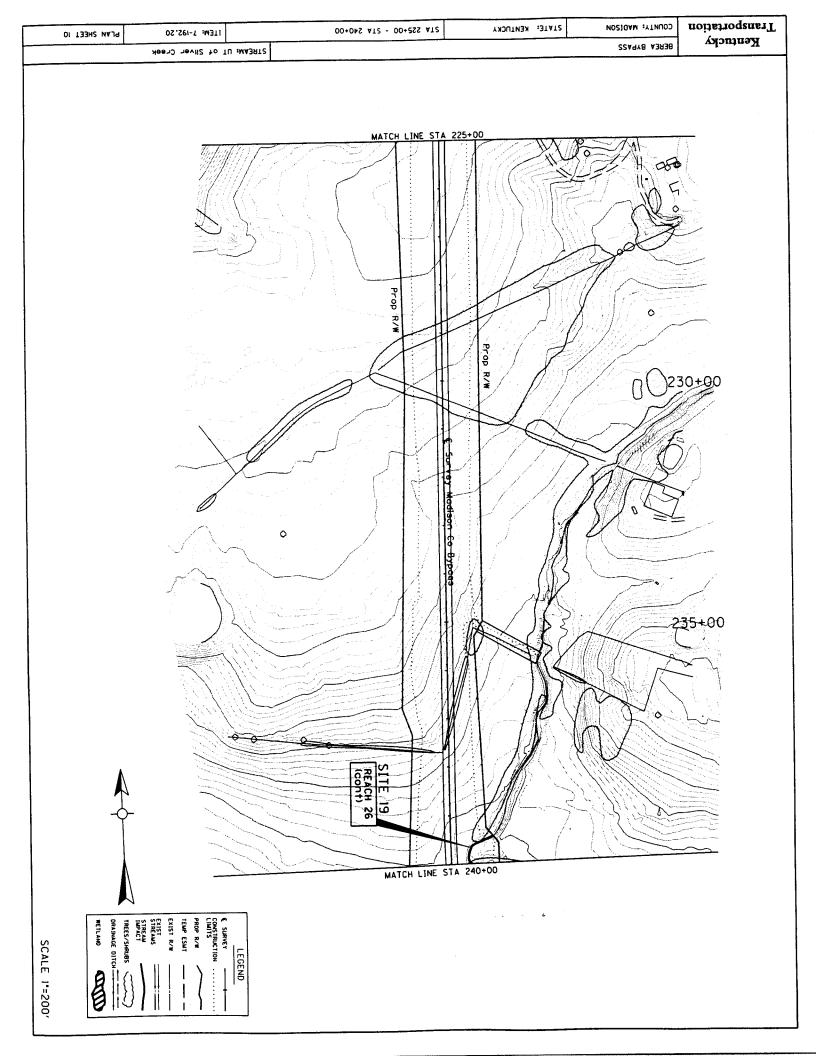


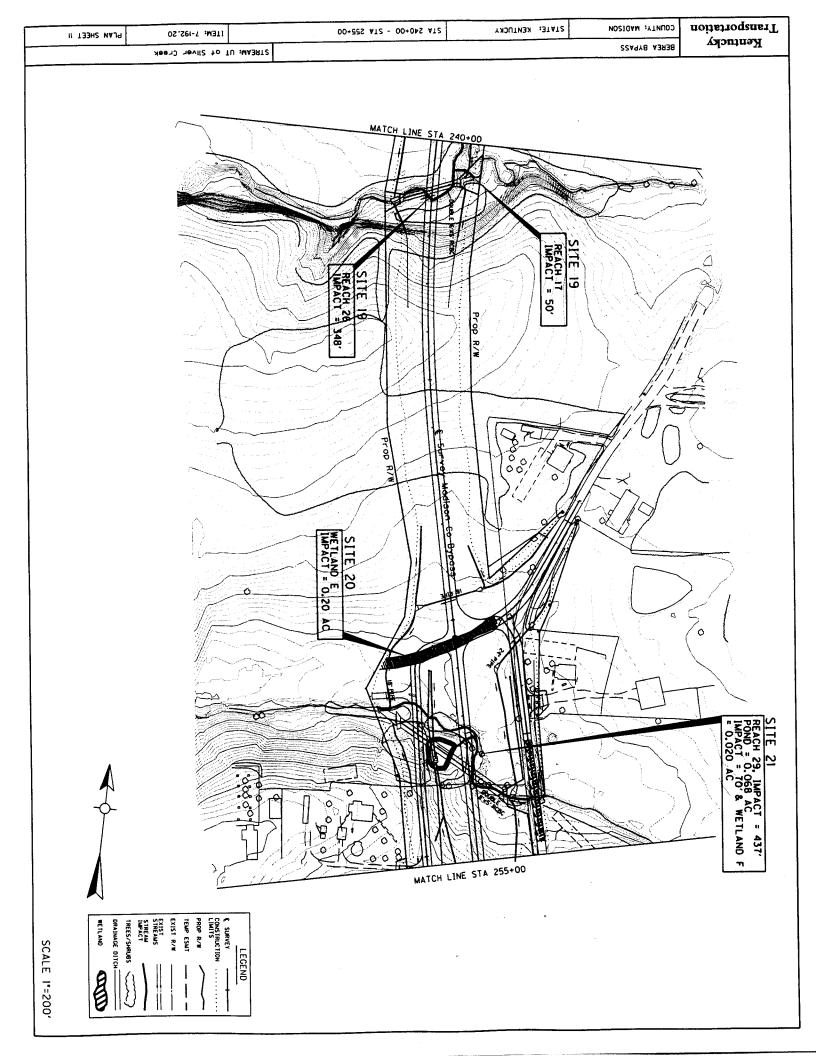


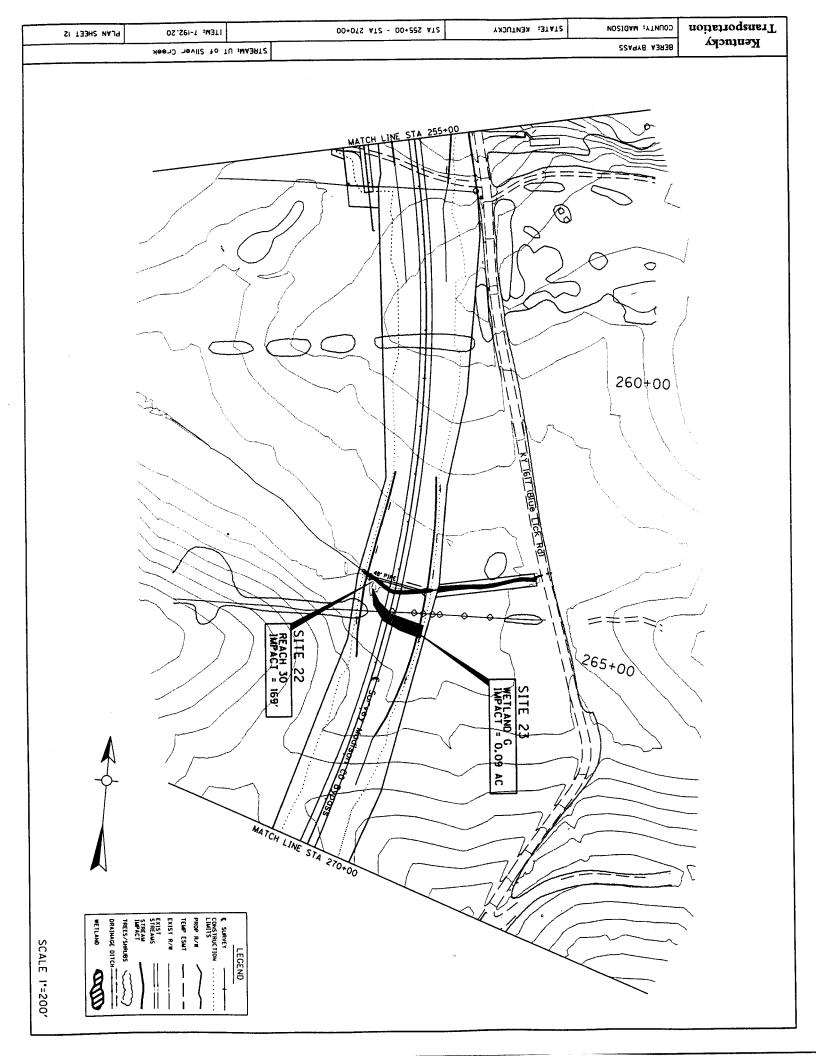


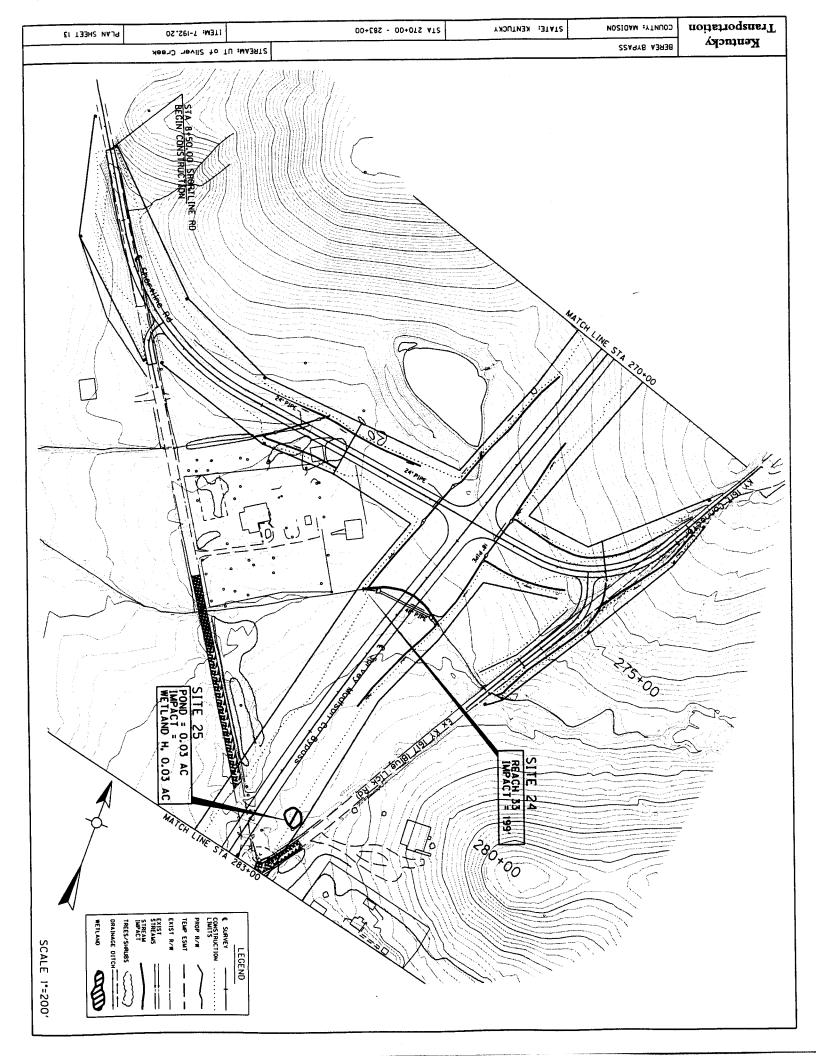


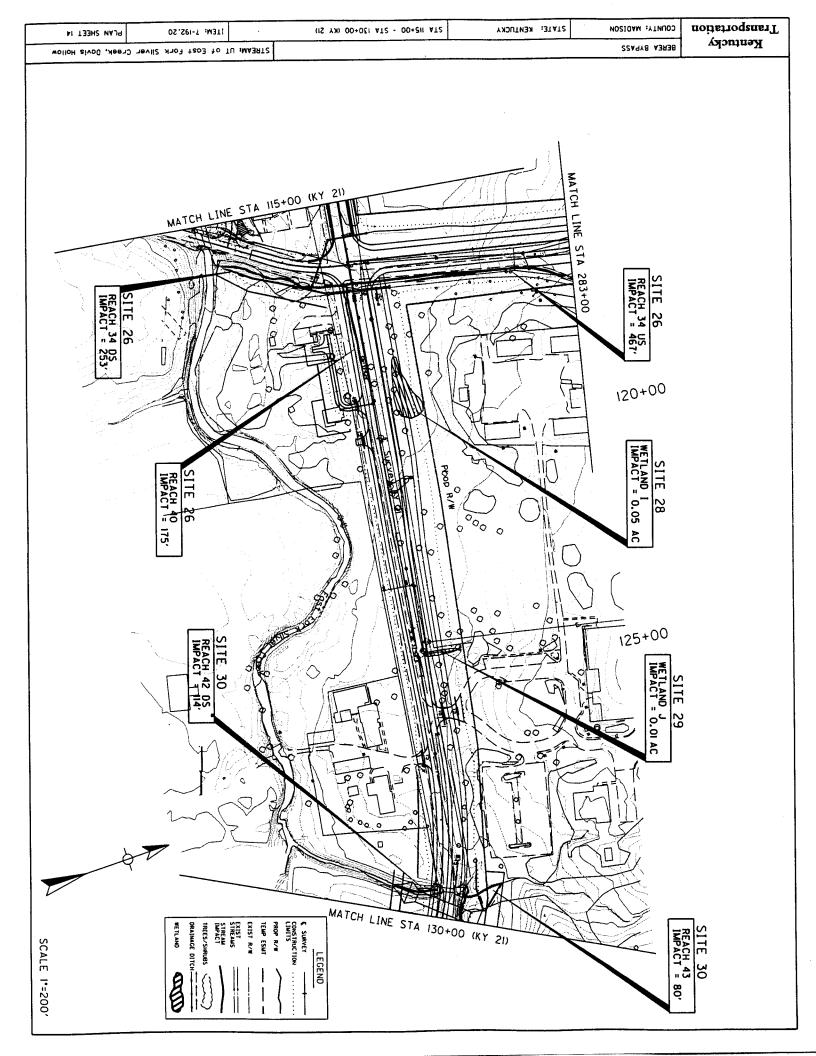


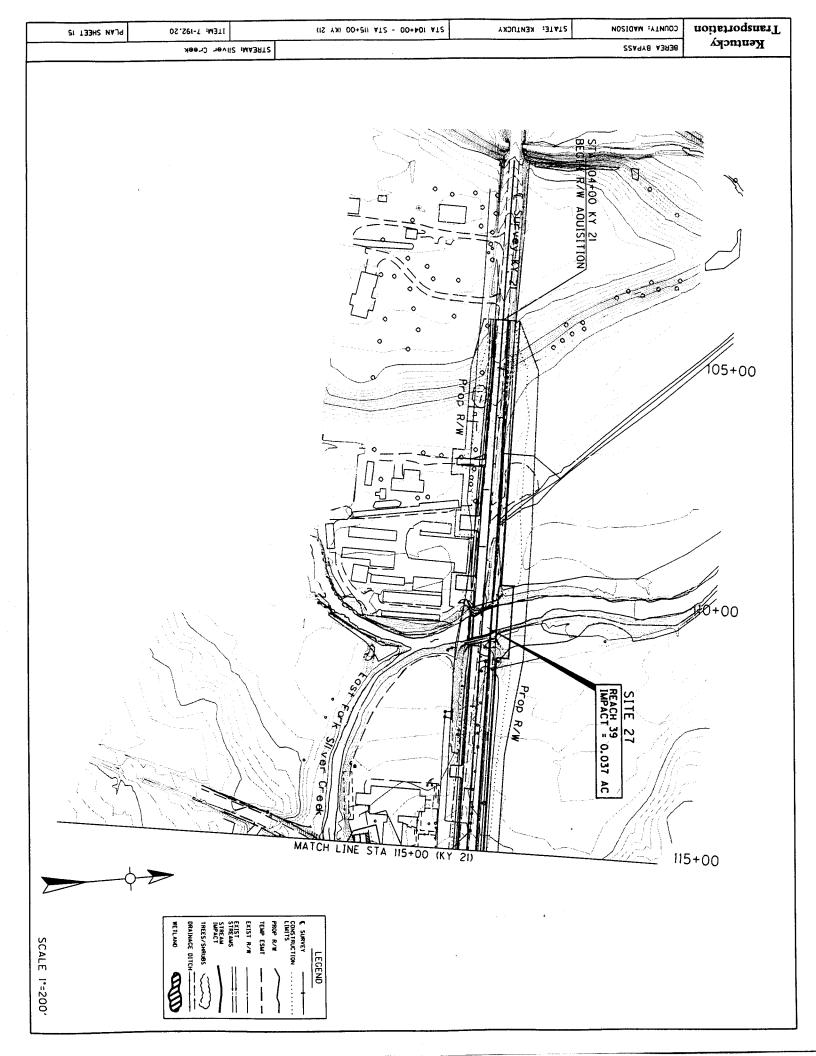


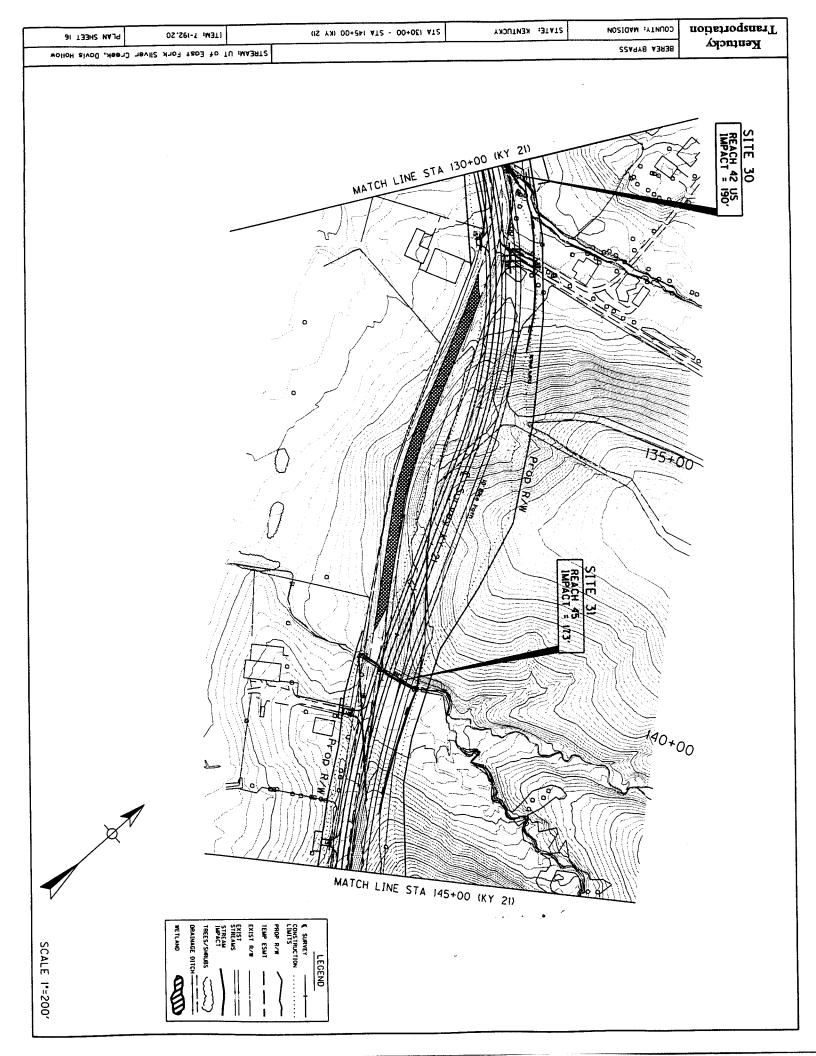




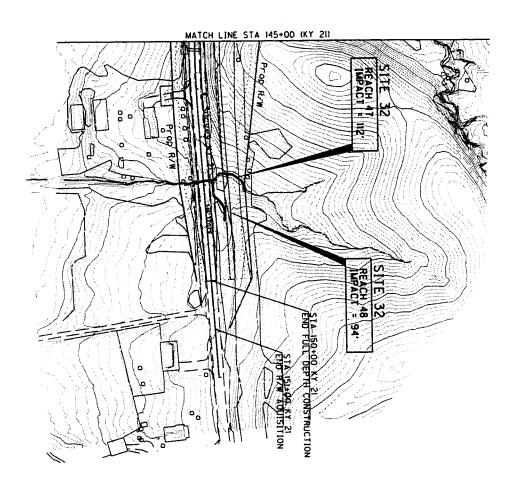


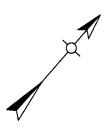


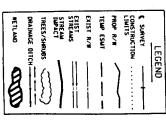




TTEM: 7-192.20 PLAN SHEET 17	(IS YM) 00+121 AT2 - 00+2M AT2	STATE: KENTUCKY	COUNTY: MADISON	Transportation
UT of East Fork Silver Creek	STREAM:		SZAGYB AJRJB	Kentucky



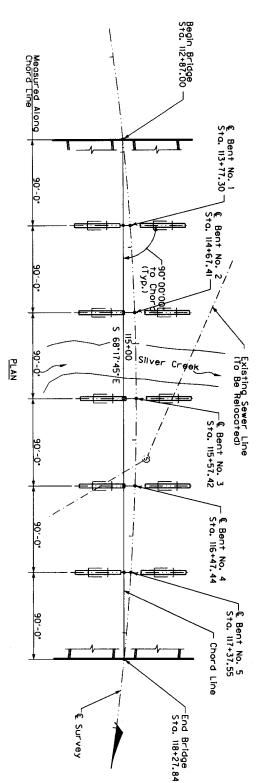




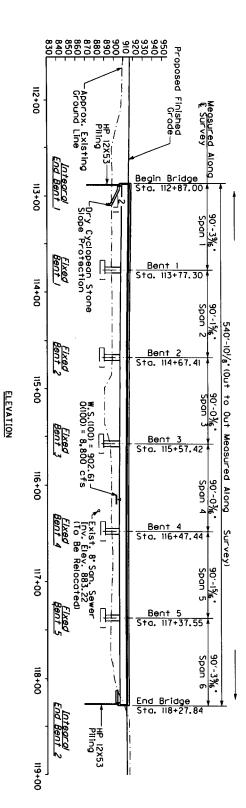
PROJECT: BEREA BYPASS

Superstructure Not Shown For Clarity

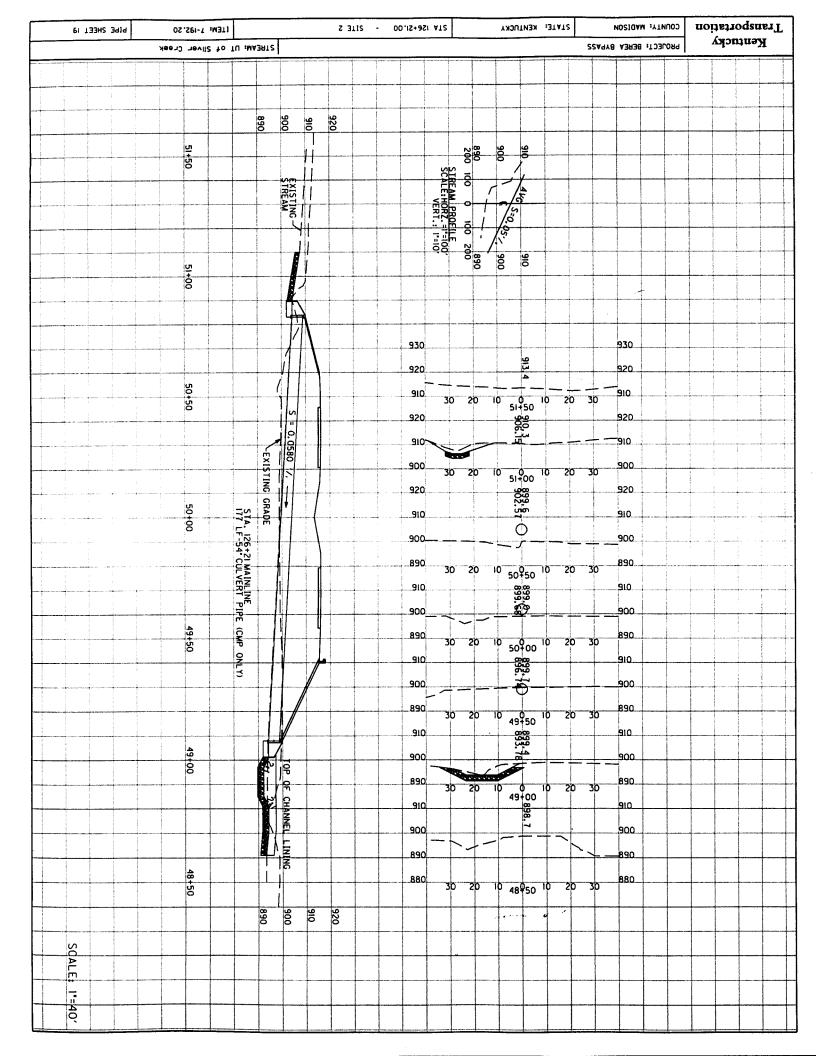
BRIDGE SHEET 18

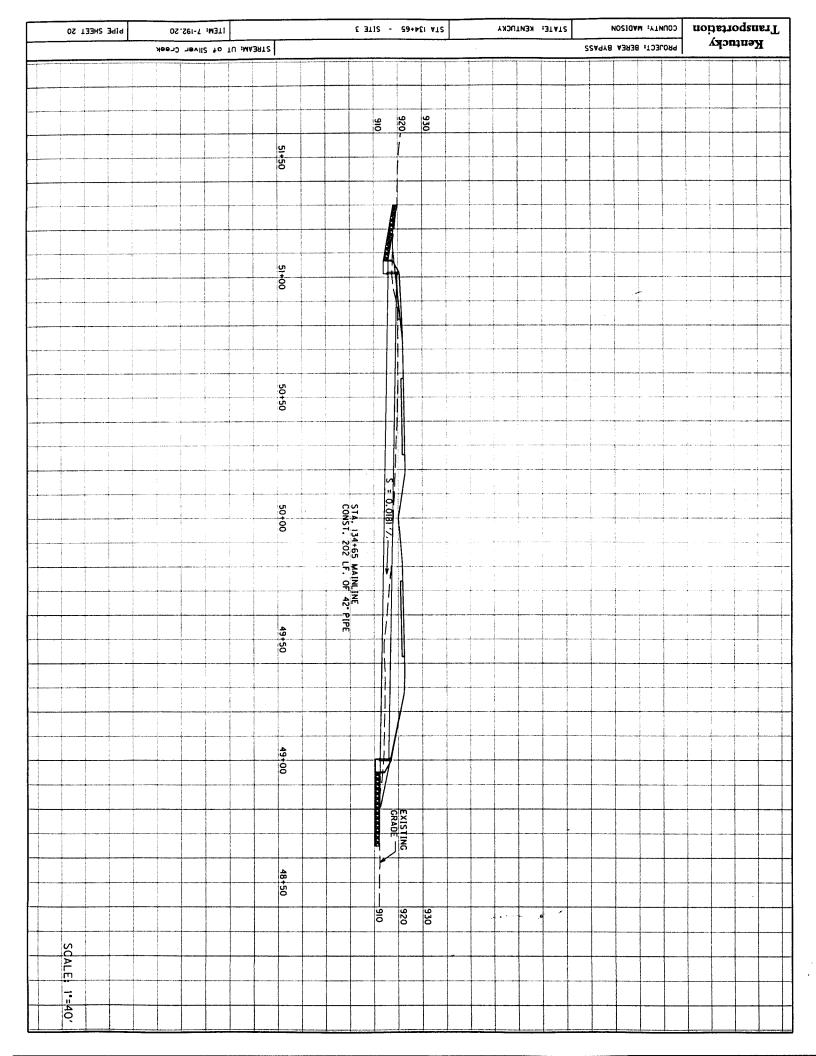


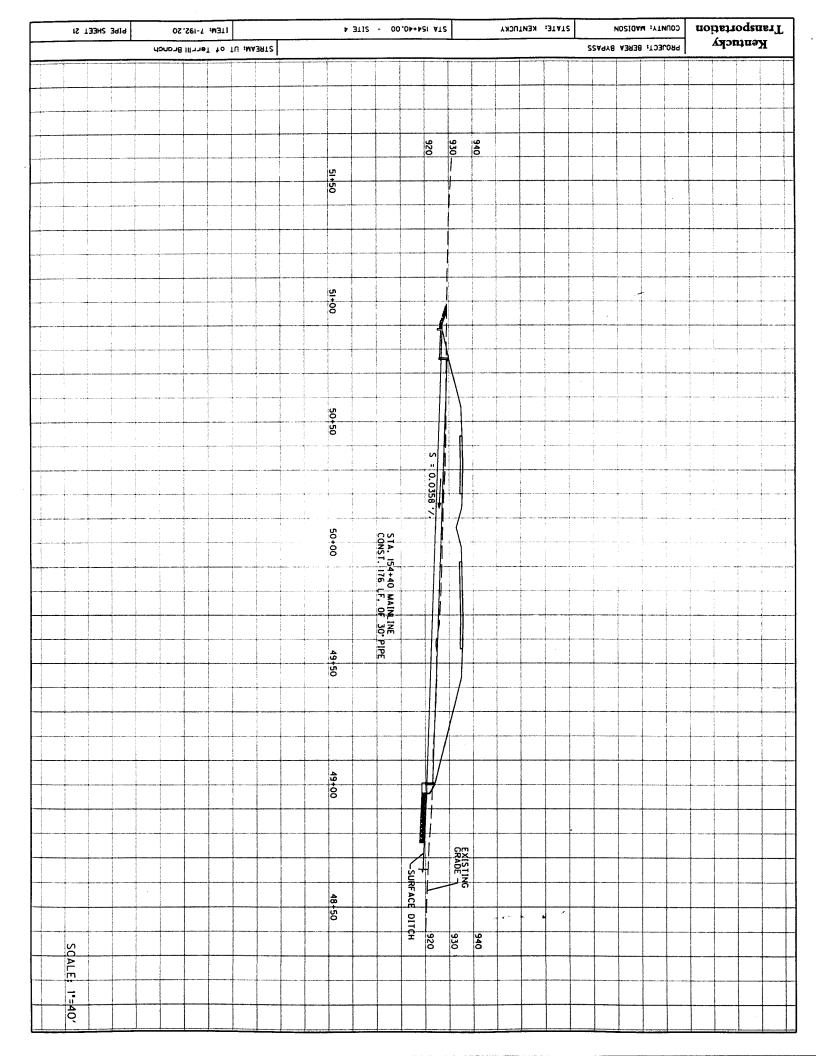
6-90' Spans ~ AASHTO Type IV Beams HS25 Live Load or Alternate Military Loading~ 12' Shoulder Width & Bridge-0' Skew~24' Roadway Width~2:1 Fill Slope

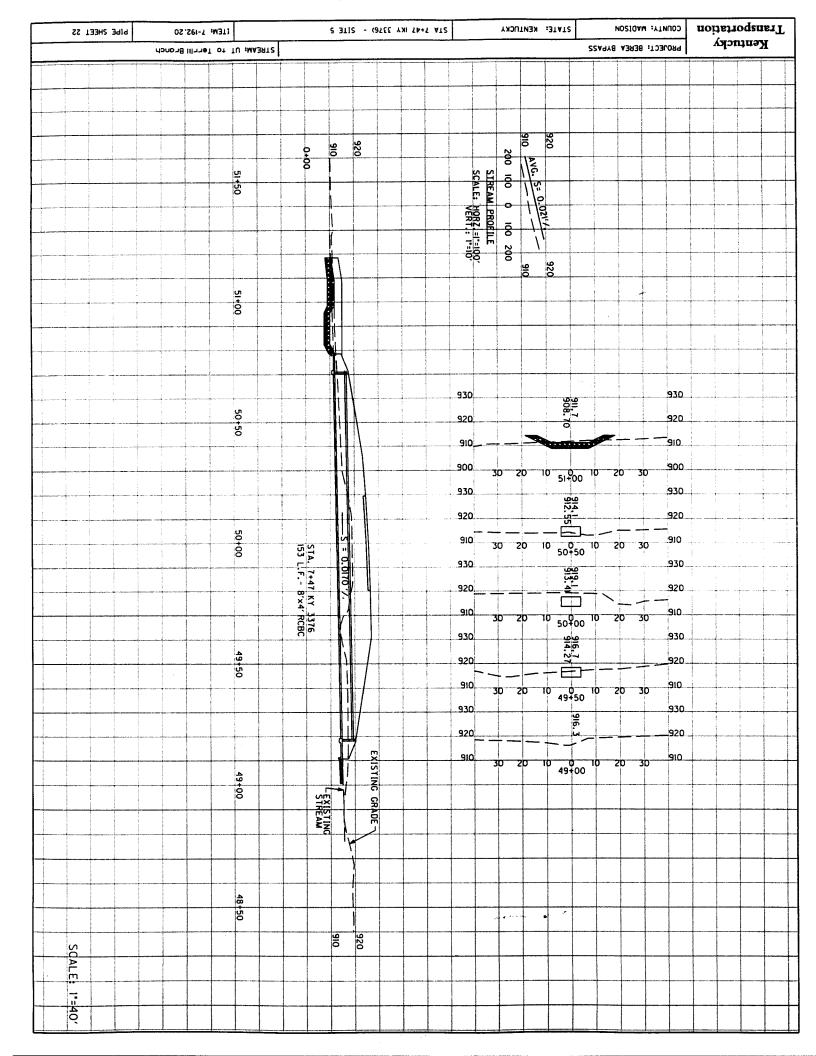


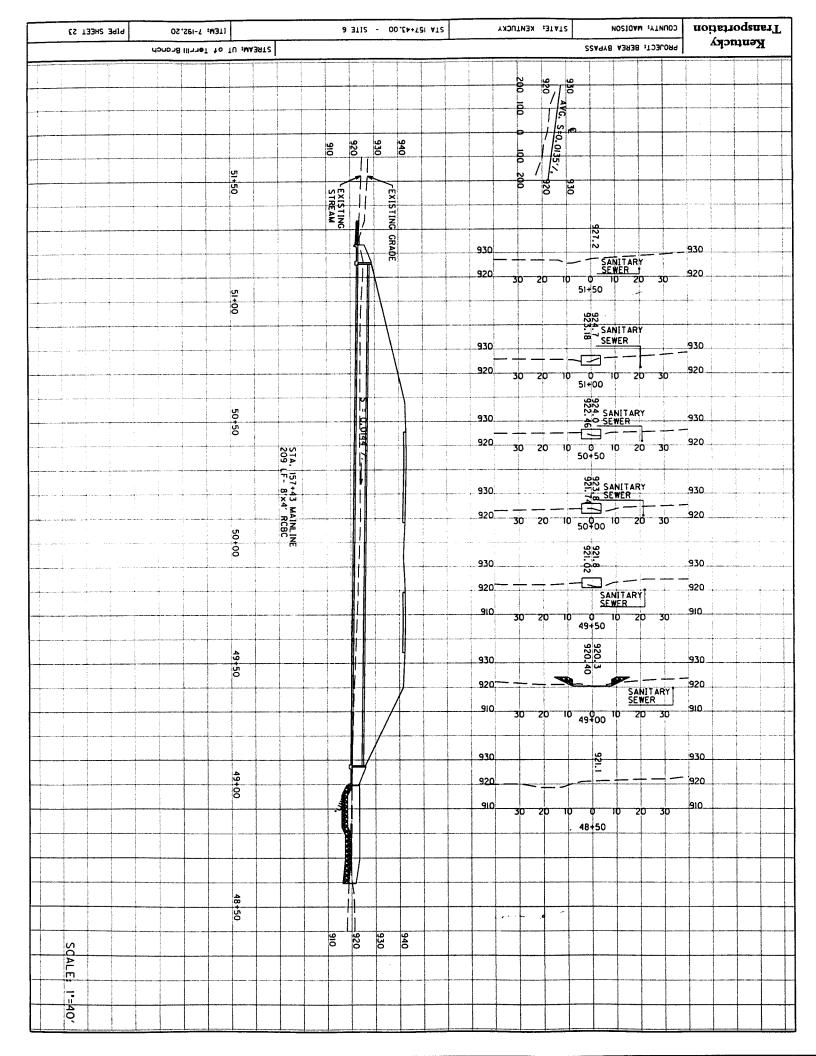
Transportation STATE: KENTUCKY COUNTY: MADISON PLAN SHEET 18A TEM: 7-192.20 Typical Low-water Crossing Detail Kentucky SEREA BYPASS STREAM: Silver Creek, SITES 1 and 27 SCALE: 1"=20'HORIZONTAL
1"=2'VERTICAL DETOUR PROFILE SHEET STA 66+00 to STA 72+00

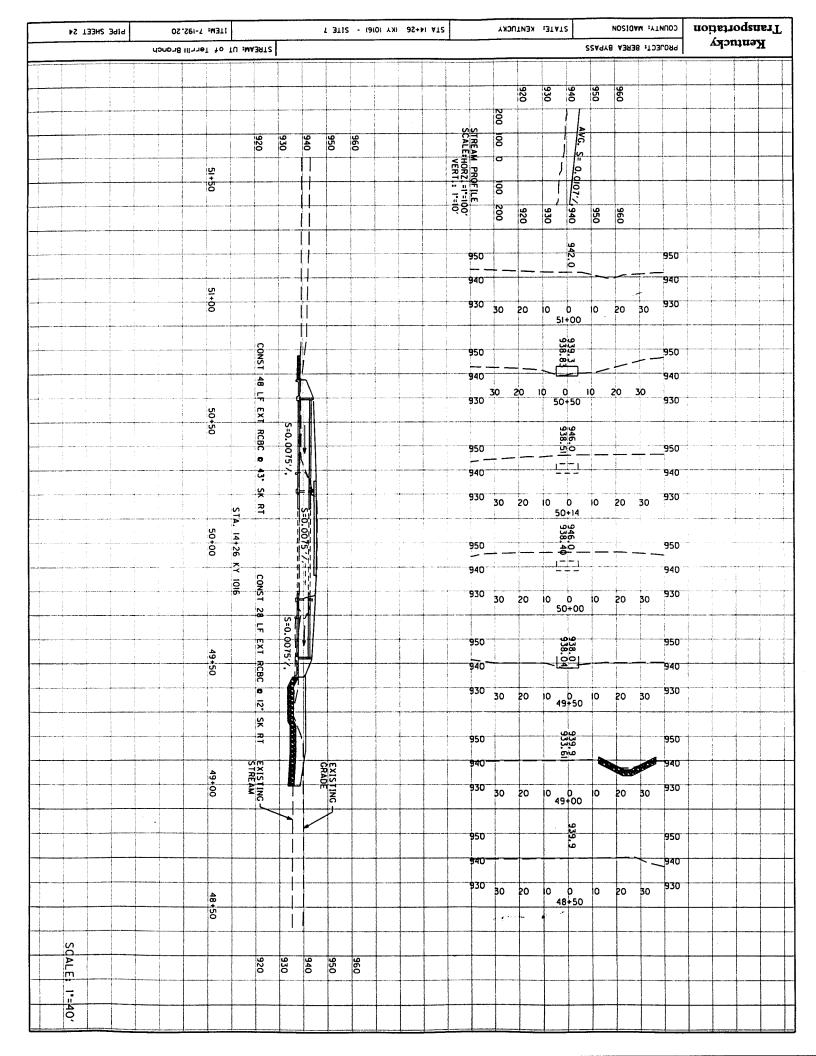


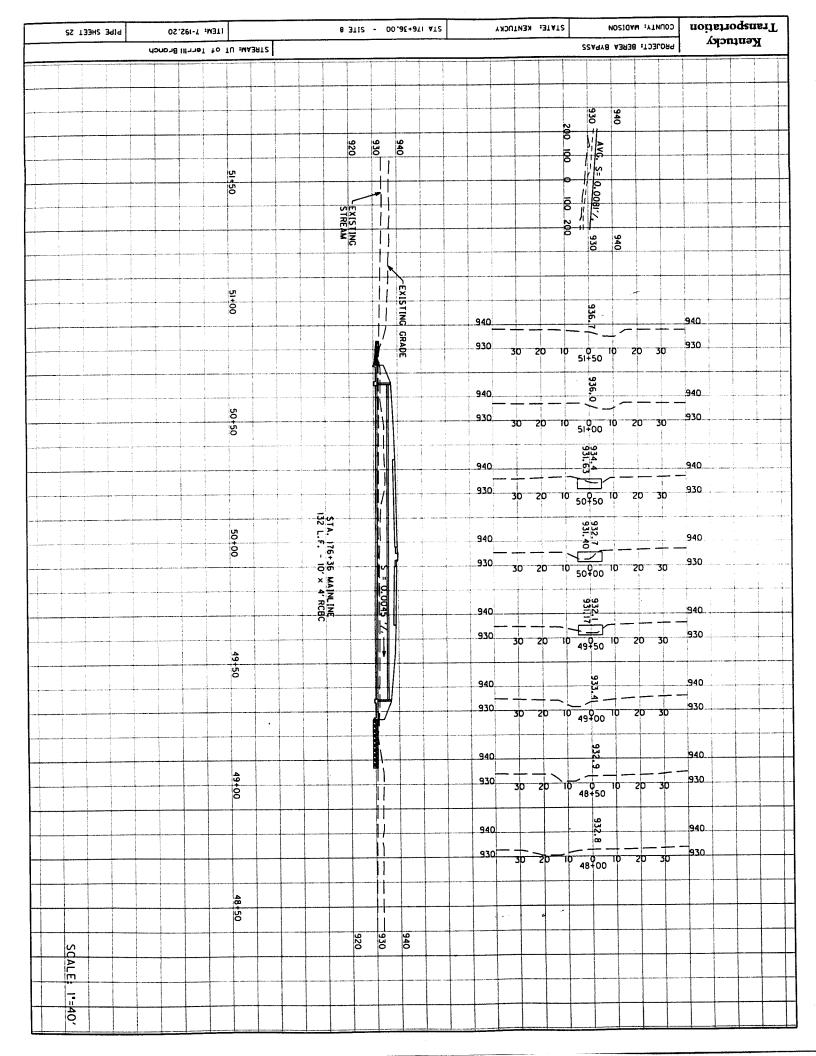


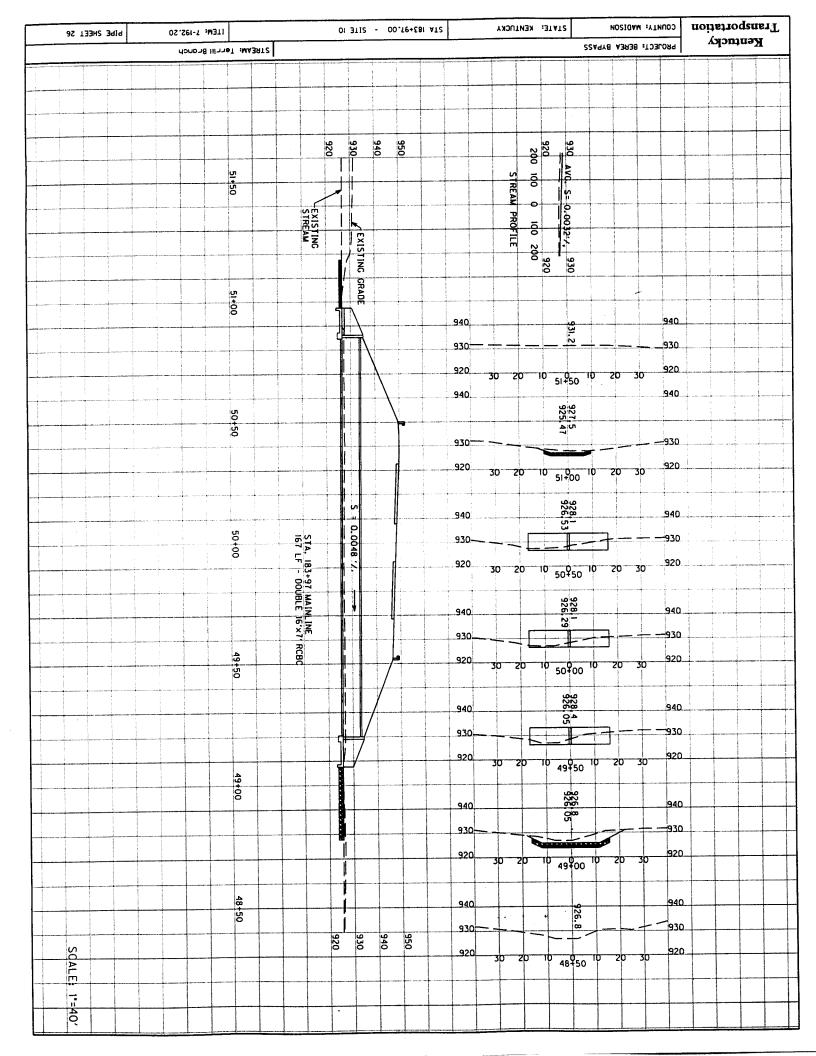


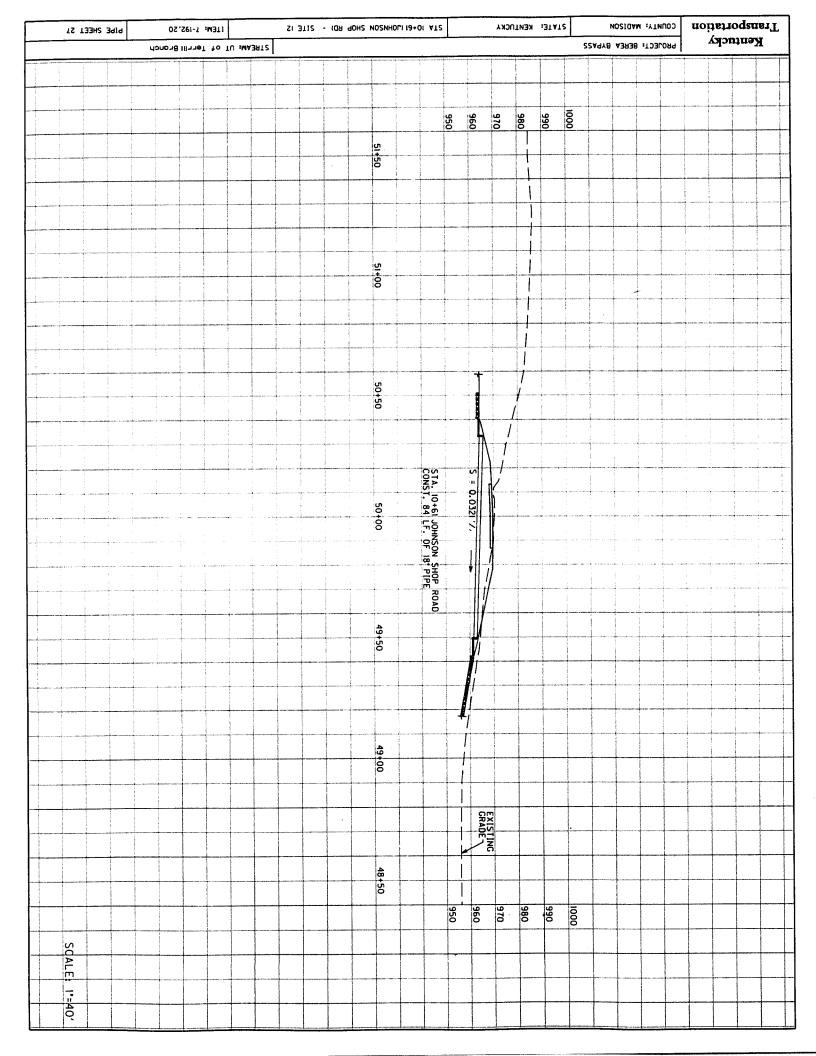


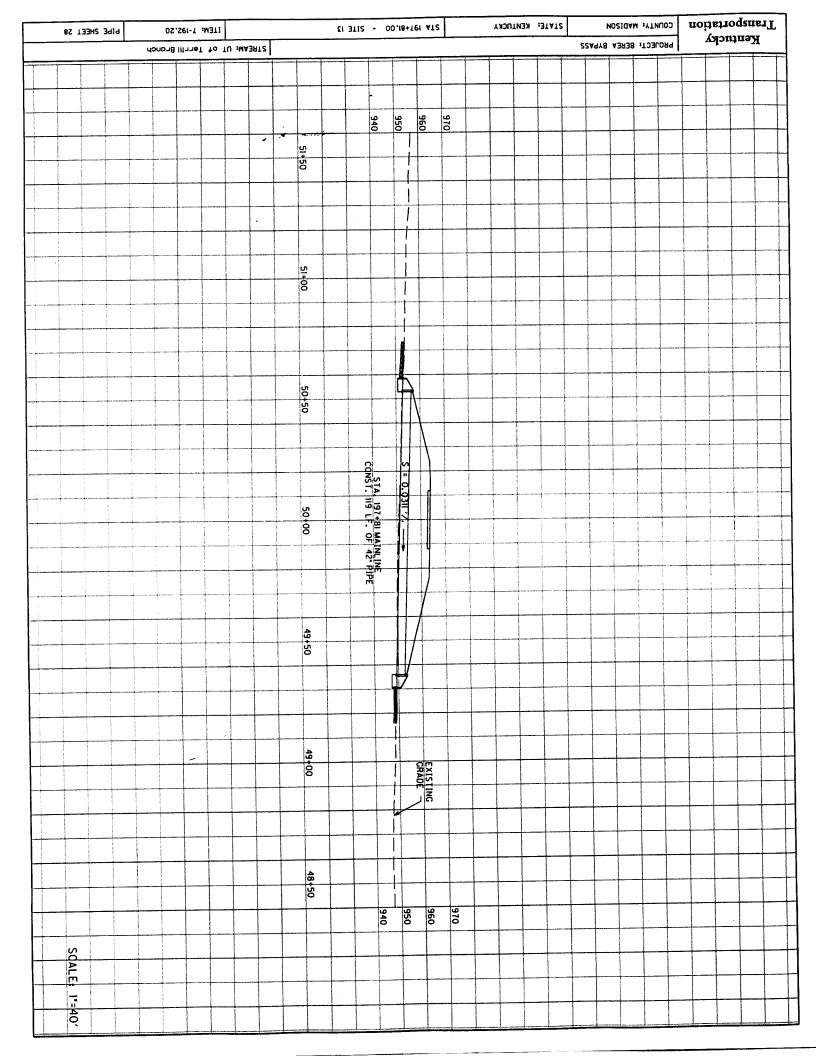


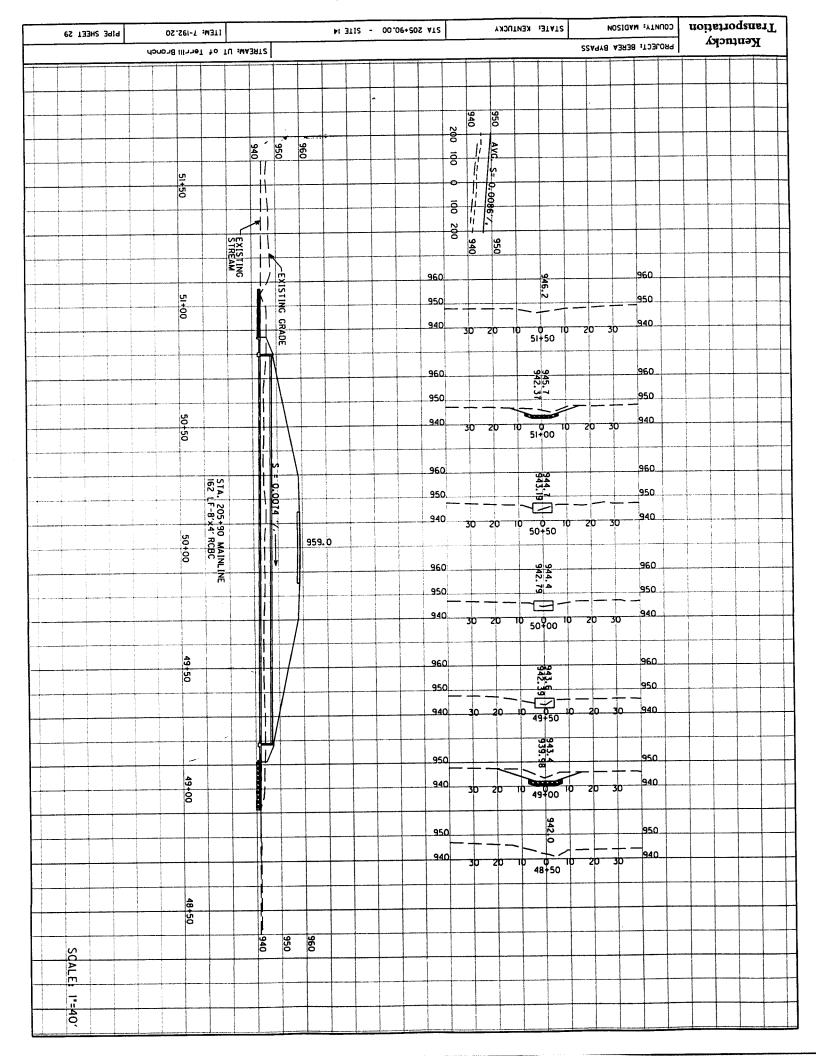


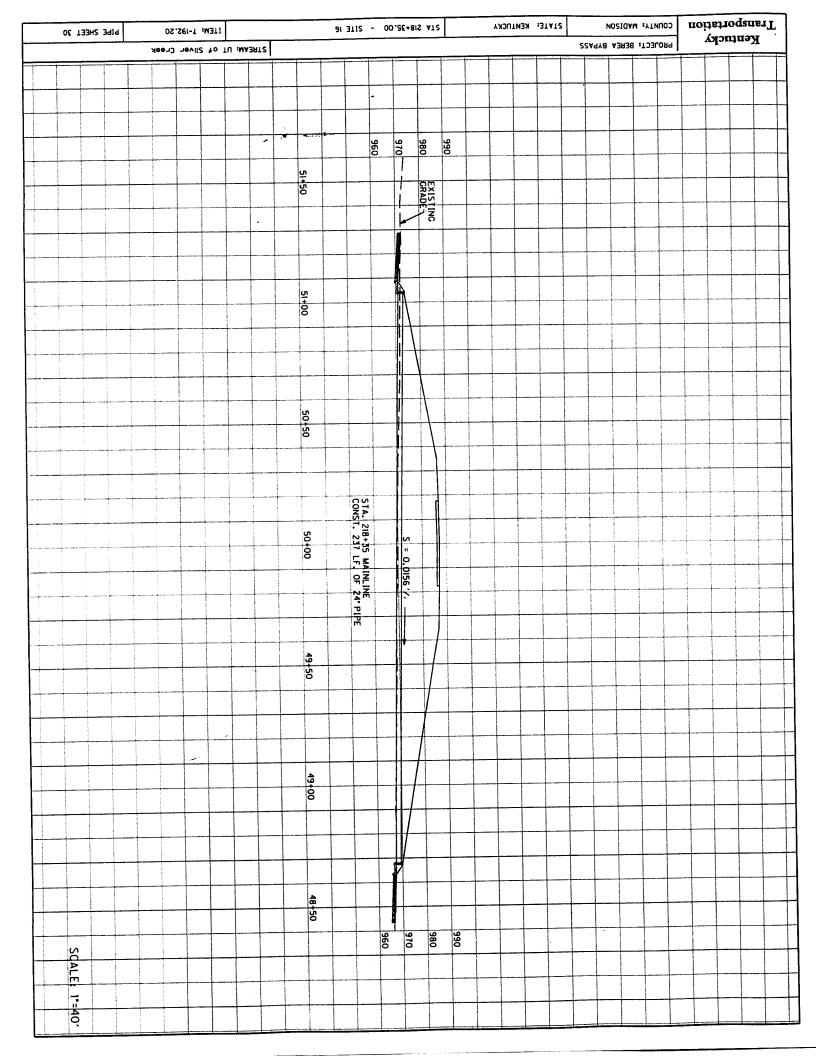


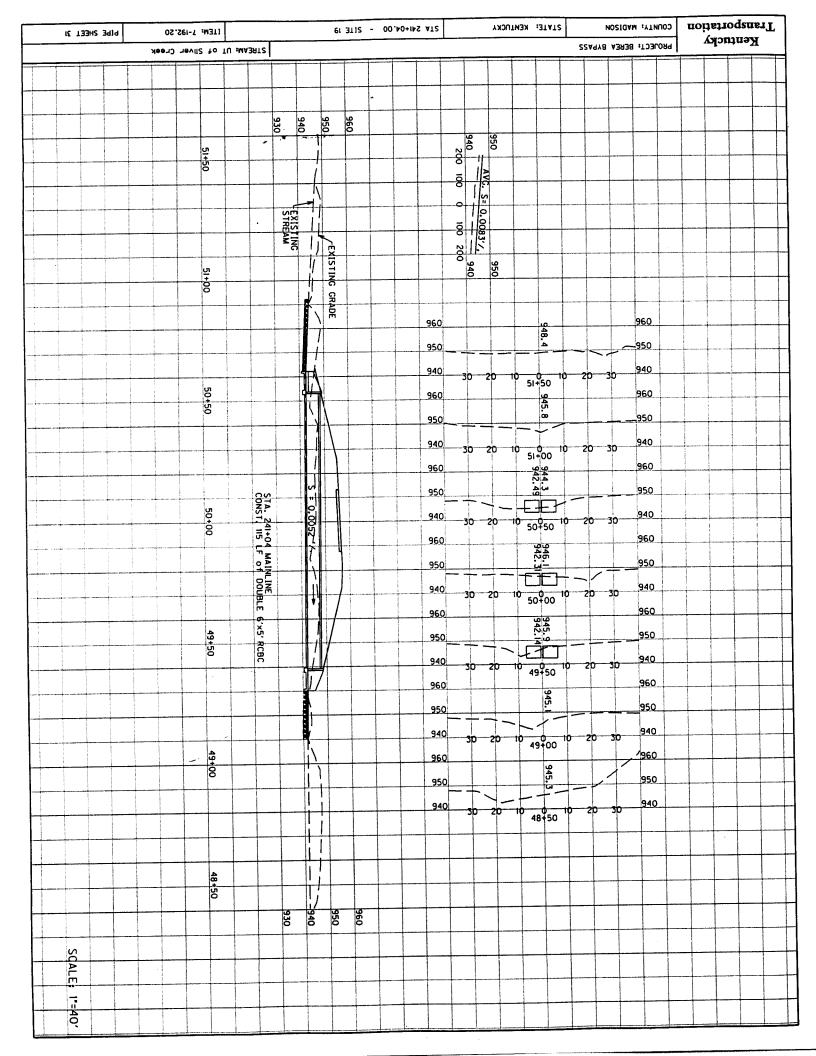


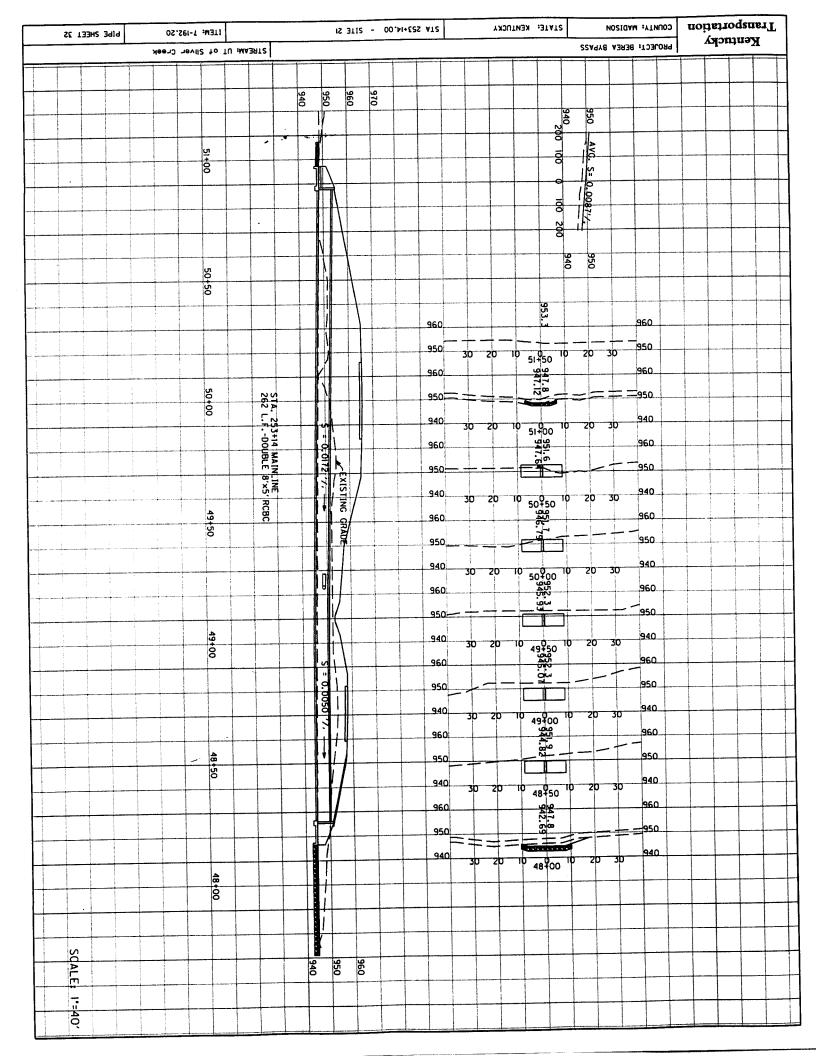


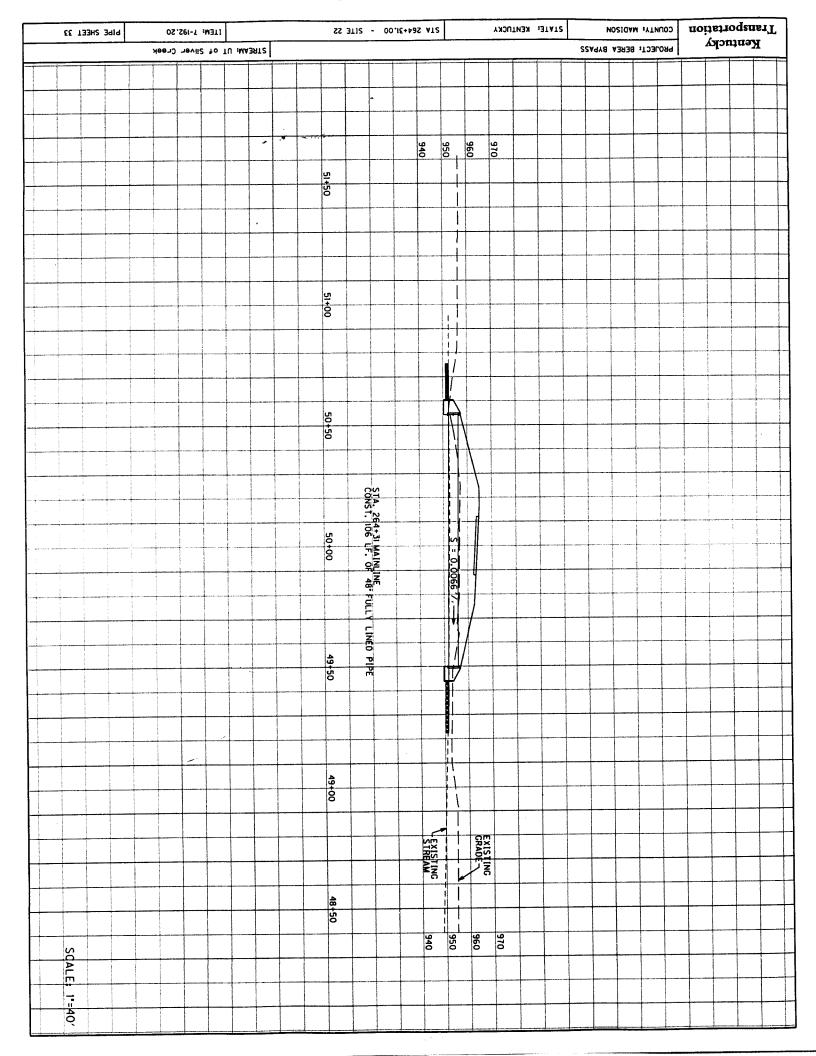


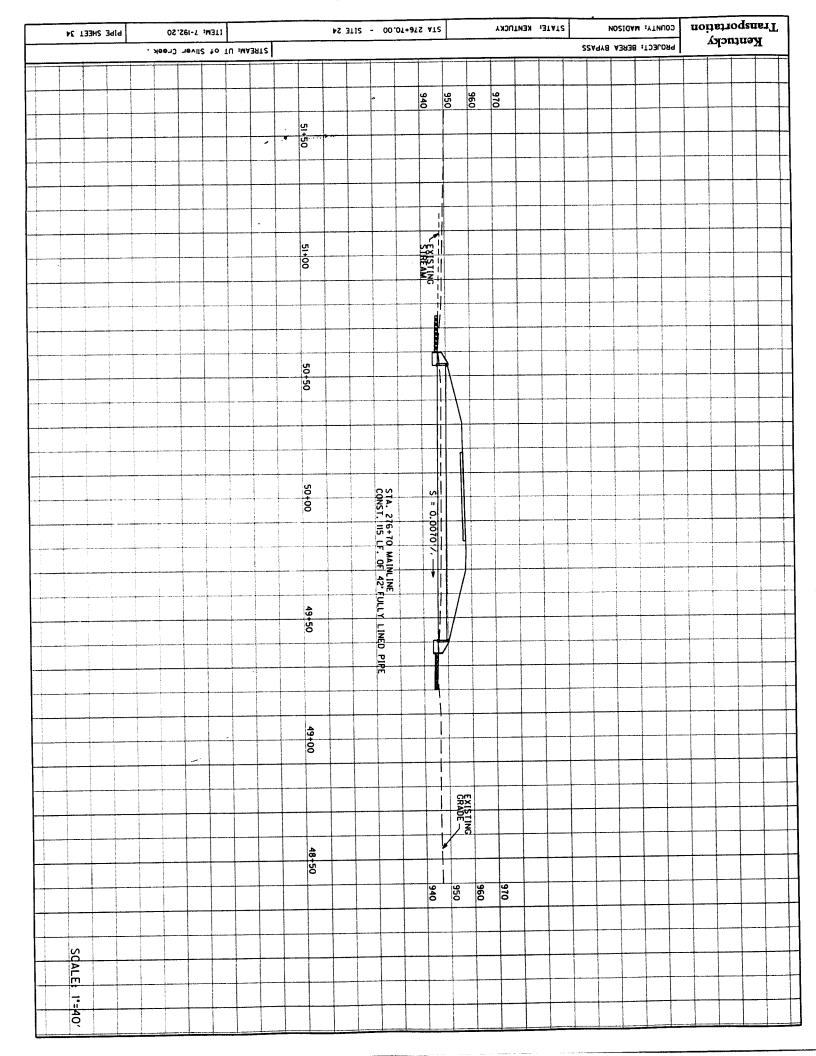


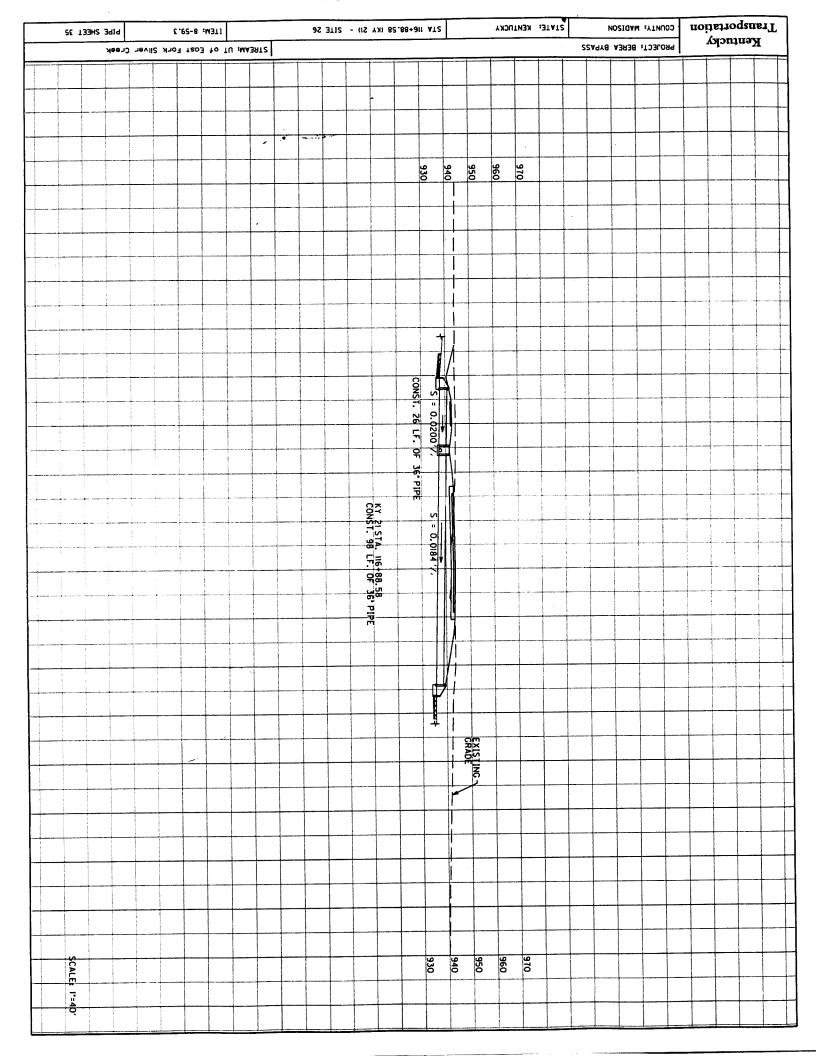




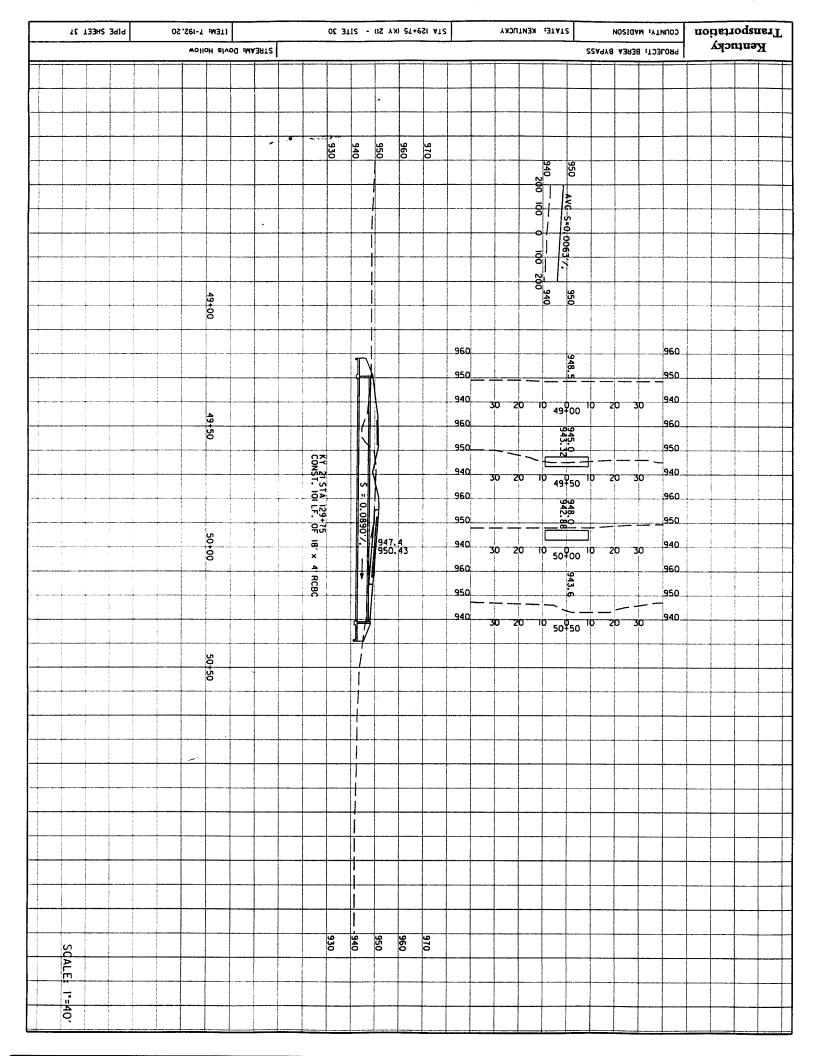


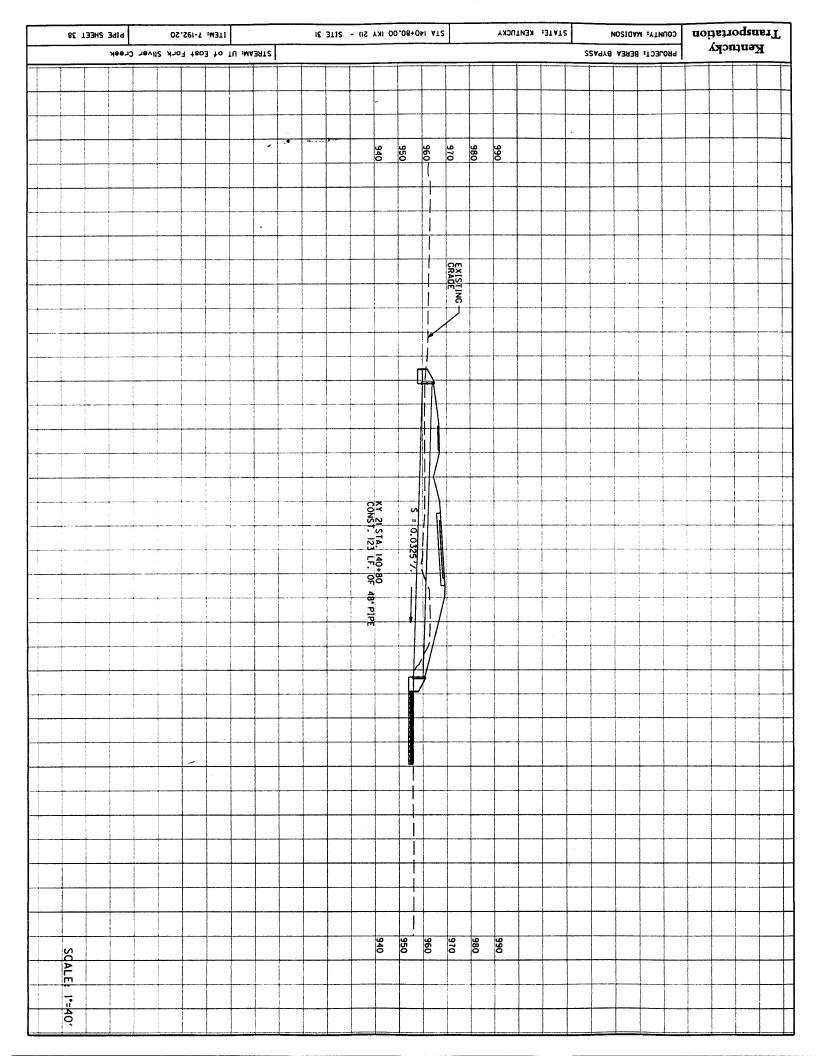






	SHS 3dld	-192,20										OII ATS	L		.nckx							сопи		ncky ortai	ren.
		99K	1VBr Cr	IS IMA	39T2					4		T							7***	A3938					
												925		930		935		940		945		950	i	0 5 5	
	S 944.3									^											/				1
	8 944.3 8 947.50													******					1		L				
					-	•		,											1		_	abla			
	943.0 946.29	 																	-			CPROP.			
																			-	H		1			
	942. 4 9 945. 32									<u> </u>		-							ļ			CRADE			
	8 373.32				$\cdot \mid$																				
	942.0 944.60																	j							
	944.60																		1 1						
	Ş 042 2																		П						
	942.2 944.14	<u> </u>																				<u> </u>			
										<u> </u>												 			
	942.5 943.92									-									╁┼			 			
										-									+						
	943. 0 9 943. 95										-								-						
	8 343.33																					-			
	943.2																								
	944.19																							and appearance of	
	Ē 037 7			,						98	SI								/						
	937.7 8 944.36	. •								S BB	> =			T											
		 								80' BRIDGE 05' SK. LT.	0+30				!				+-1				-		
	930.5 944.32									-	CONST	-													
											ST.	-		<u> </u>		- -			\exists						
	₹ 943.3 8 944.06									<u> </u>	<u> </u>					-	*******************		14						
	0									ļ	ļ								4						
	942.3 943.58																		Ш						
	943.58				-	200				and the second								Ì	1.						
	5 941 5									The second second								i	12						
	941.5 O 942.99																	1	1			 			
																		1	-						
	940.5 942.40		-					·										1	 			ļ		-	
										<u> </u>					ļ							 			
	939. 6 941. 94		-						ļ						-		-i			-		 			
	ō '''',		<u> </u>						<u> </u>	-	<u> </u>				ļ		Li.	\sqcup				-			
	939. 5 941. 71										ļ	<u> </u>					1			ļ					
	941. 71																								
	₹ 940 0																								
SS	940.0 8 941.73		1									1													
SCALE:			†							<u>† </u>								lil				1			
<u> </u>	941. 4 941. 99			\vdash					-	 	 	-						-\		 		+			
: 1"=100' HORIZ							-								 	 		+	 	 		-			
동 -	942.1 8 942.37	+	-						ļ	-					<u> </u>	-				-		-	-		
$\check{\pi}$	J											925		930		935		940		945		950		955	





MITIGATION DISCUSSION

Item No. 7-192.20

For intermittent and perennial stream impacts, the need for mitigation was based on whether an impact site was greater than 0.10 acres in area, or greater than 500' in length. For ephemeral streams, mitigation needs were based on impacts greater than 0.10 acres, but no length was utilized. Based on the criteria, there were no sites that required mitigation.

The wetland mitigation needs were determined for impacts greater than 0.10 acres. Of the ten wetlands identified, only one (Wetland E) should require mitigation. The other wetland impacts were either individually less than 0.10 acre, or where they were hydrologically connected with impacted streams, the total site impact was still less than 0.10 acres. Mitigation for the wetland will be accomplished at one of the state owned wetland mitigation bank sites. Mitigation for 0.2 acres of wetland loss will be the debiting of 0.4 acres of credit from the Lincoln Co Wetland Mitigation Site, which is currently under permit review for the addition of 30+ acres of additional wetland restoration credits. If credits from Lincoln County are not available prior to permitting, KYTC would propose the payment of the current wetland in-lieu fee.

It should be noted that the Division of Water will require mitigation for impacts resulting from this project. Based on their criteria for impacts greater than 200' on "blue-line" streams within watersheds of 250 acres or greater; the culverts at Sta. 183+97, Sta. 253+14, and KY21-Sta. 129+75 will require mitigation.

116541312110987654 Site # 21 30 5 Station ** Number Reach 16 42US 42DS В 29 Stream Type ह्व ह्व ğ Per ဂ cuivert culvert culvert Type of Impact ▫ Acreage of Watershed Initial RPB Impact size in acres Score 0.022 0.029 0.05 ш Before Impact 6 F 897 489 489 289 9 134 7 32 8 Initial Quality H J J Berea Bypass Item No. 7-192.20 poor poor poor Impact Length 190 437 256 9 Ratio 155 1.5 1.5 6 χ. Debit 656 285 171 384 Mitigation Predicted Predicted Final Final Required? RPB score Quality Length Ratio Z 00 0 0 N 0 After Impact 15 00 0 0 P 00 0 0 Credits Total ဝ 00 0 0 Balance -1496 -285 -171 -656 R -384 8

.

-R STREAM NAME:	each 16 (Terre	ell Br.)	1.00	ATION:	- Sta. 183+97 (Mainlin	e)	
STREAM NAME.			LUCA	ATION:	-Silver Creek	(Kentu	ucky River)
STATION:		E AREA (AC) -	BASI	N/WATERSHI		,	
N37-35-38	LONG:	W84-15-25	COL	NITV. I	Madison USGS 7.5 TC	ND()	-Berea
-8/28/06	LONG.			N11, -iv	-Rob Lewis, Jaso		on
DATE:	TIME:			STIGATORS;			
TYPE SAMPLE: P-C		Macroinvertebrate					
WEATHER: No	w Past 2 □ He	24 hours eavy rain	Has there	been a heavy ☑No	rain in the last 7 days?	,	
<u></u>	□ Ste	eady rain	Air temper		°F. Inches rainf	all in p	east 24 hours 0 in
_	□Inte	ermittent showers	%(Cloud Cover		·	
P-Chem: Temp (°F)		ear/sunny (mg/l)	% Saturation	nH(S	S.U.) Cond.	3	35 П Grah
INSTREAM WATERSH				Pri(c	Cond.		
FEATURES	I .	OCAL WATERS	HED FEATUR	RES:			
Stream Width 5.0	ft Pi	redominant Surrou			_		
Range of Depth $0-1$ Average Velocity	$\frac{1.0}{\text{ft/s}}$ ft \square	Surface Mining		☐ Construct ☐ Commerc			ina
Discharge	- C- -	Deep Mining Oil Wells		☐ Industrial			ang
Est. Reach Length		Land Disposal		✓ Row Crop			ff/Storm Sewers
Hydraulic Structures:		Ç+,	ream Flow;		C+	ream T	vne:
	Bridge Abutr	ments Dry		d 🗖 Low		Pere	
	Waterfalls	☐ Hig	h 🛭 Very			Eph	emeral Seep
	Culverts	· ·		T			
Riparian Vegetation: Dominate Type:		Dom. Tree/Shru	b Taxa	Canopy Cove	er; sposed (0-25%)		nel Alterations; Dredging
	Shrubs	Maple			Exposed (25-50%)		Channelization
	Herbaceous	Ironweed		☐ Partially	Shaded (50-75%)	((☑ Full □ Partial)
Number of Strata	<u> </u>	Joe Pie weed		☐ Fully Sh	aded (75-100%)		
		,			· · · · · · · · · · · · · · · · · · ·		
Substrate ☑ Est. □	P.C	Riffle25	5%	Run;	%	Pool	75 %
Silt/Clay (<0.06 mm)			, , , , , , , , , , , , , , , , , , , ,				
Sand (0.06-2 mm) Gravel (2-64 mm)		60	າ				60
Cobble (64-256 mm)		30					30
Boulders (>256 mm)							
Bedrock	I	10)				10
Habitat Parameter	Or	ptimal	Subop	Condition	Category Marginal		Poor
1 al allictei		70% of substrate	40-70% mix of		20-40% mix of stable ha	bitat;	Less than 20-% stable
1. Epifaunal	favorable for	epifaunal	well suited for	full	habitat availability less t		habitat" lack of habitat is
Substrate/ Available		and fish cover; submerged logs,	colonization po adequate habita		desirable; substrate frequently disturbed or		obvious; substrate unstable or lacking.
Cover	undercut bank		maintenance of		removed.		lacking.
	other stable h		presence of add				
		full colonization, logs/snags that	substrate in the fall, but not yet				
	are not new fa		colonization (n	nay rate at			
CCOPE	transient.	10 17 11	high and of sca		10 0 0 7	_	E 4 2 2 1 0
SCORE	20 19 Gravel cobbl	18 17 16 le, and boulder	Gravel, cobble	3 12 11 and boulder	10 9 8 7 (Gravel, cobble, and boul		5 4 3 2 1 0 Gravel, cobble, and boulder
2. Embeddedness	particles are (0-25%	particles are 25	5-50%	particles are 50-75%	İ	particles are more than 75%
		y fine sediment.	surrounded by	fine sediment.	surrounded by fine sedin	nent.	surrounded by fine sediment.
	diversity of n	cobble provides iche space.				İ	
SCORE	20 19	18 17	15 14 1	13 12 11	10 9 8 7 6	5	5 4 3 2 1 0
	All four veloc		Only 3 of the 4		Only 2 of the 4 habitat		Dominated by 1
3. Velocity/Depth Regime		ent (slow-deep, , fast-deep, fast-	present (if fast- missing, score		regimes present (if fast- shallow or slow shallow	are	velocity/depth regime.
Regime	shallow. Deep		missing, score		missing, score low)		
SCORE	20 19	18 17 16		13 12 11	10 9 8 7	5	5 4 3 2 1 0

Deposition	Little or no enlarge islands or point ba than 5% of the bot by sediment depos	rs and less ttom affected	Some new formation, gravel, sand 5-30% of the affected; slippools.	mostly t d or fine he botto	from e sediment; m		d or fine new bar om affect eposits as, const modera of pools	e sediment rs; 30-50% eted; at crictions,	of the botto frequently; absent due sediment d	nt; mor om char pools a to subs epositio	l bar e than 50% nging almost tantial		
SCORE 5. Channel Flow Status	Water reaches bas lower banks, and tamount of channel exposed.	minimal I substrate is	exposed.	> 75% of hannel; substrat	or <25% te is	Water fills available c riffle subst exposed.	25-75% hannel, rates are	and/or	Very little and mostly standing po	water in present ools.	t as		
SCORE 6. Channel Alteration	20 19 18 Channelization or absent or minimal normal pattern.	dreaging	Some chan usually in a abutments; channeliza	nelization areas of evidence tion, i.e. an past 2 but reco	bridge ce of past ., dredging, 20 yr.) may ent	10 9 8 7 6 Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.			Banks short cement; ov stream read disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.			
SCORE 7 Frequency of Riffles	20 19 18 Occurrence of riff frequent; spacing riffles 5 to 7 streat Variety of habitat streams where riff continuous, bould are important.	fles relatively between m widths. is key. In fles are	15) 14	13 e of riffl distance ded by s	12 11 les te between stream	10 9 8 7 6 Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.			Generally shallow rit distance be	5 4 3 2 1 0 Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.			
SCORE 8. Bank Stability	20 19 18 Banks stable; evice erosion or bank faor minimal; little future problems. affected.	dence of ailure absent potential for	Moderately infrequent, erosion mo	y stable, , small a ostly hea oank in t	areas of aled over.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.			"raw" area straight se obvious ba	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional			
SCORE (LB)	Left Bank	10 9	8	7	6	5	4	3	2	1	0		
SCORE (RB)	Right Bank	10 9	8	7	6	5	4	3	2	1	0		
9. Vegetative Protection (score each bank)	More than 90% o streambank surface immediate riparial covered by native including trees, us shrubs, or nonword macrophytes; veg disruption through mowing minimal evident; almost all allowed to grow restricted.	ces and an zone c vegetation, nderstory ody getative h grazing or or not ll plants naturally	great exter half of the stubble he	overed by but one ot well- d; disrupt t not aff th potenti; more potentia	oy native e class of ption fecting full ntial to any than one- al plant naining.	or closely common; of the pote height rem	overed to a; disrup- patches of cropped less than ential planaining.	oy tion of bare soil d vegetation n one-half ant stubble	by vegetat streamban very high; been remo centimeter stubble he	k surfaction; disk vegetavegetators or les	ces covered ruptive of ation is tion has 5 s in average		
SCORE (LB)	Left Bank	10 9	8	7	6	5	4	3	2	1	0		
SCORE (RB)	Right Bank	10 9	8	7	6	5	4	3	2	1	0		
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian meters; human ac parking lots, road cuts, lawns, or cre impacted zone	ctivities (i.e., lbeds, clear-	meters; hu	man act	zone 12-18 tivities have ly		ıman ac	zone 6-12 tivities have great deal.	Width of meters; lit vegetation activities.	tle or n	o riparian		
SCORE (LB)	Left Bank	10 9	8	7	6	5	4	3	2	1	0		
SCORE	1		1										

Total Score

134

					311444					
-R STREAM NAME:	leach 29		1.00	- Sta. 253+14 (Mainline) LOCATION:						
STALAWI NAME.			LOCA	ATION:	-Silver Creek	(Kentuc	ckv River)			
STATION:	DRAINAG	E AREA (AC) -	BASI	N/WATERSHI						
N37-34-23	LONG:	W84-15-18	COL	NTY; -A	Madison USGS 7.5 TO)D():	-Berea			
-8/30/06	LONG.	•	- 000	NII, -//	-Rob Lewis, Julie					
DATE:		<u>:</u> □AM ☑P	Table 1	ESTIGATORS;						
TYPE SAMPLE: P-C		Macroinvertebrate								
WEATHER: No		24 hours eavy rain	Has there ☑Yes	been a heavy	rain in the last 7 days	?				
		eady rain	Air temper		°F. Inches rain	fall in pa	ast 24 hours in			
	☑Int	termittent showers	90 %	Cloud Cover	<u></u>					
	□Cle	ear/sunny								
P-Chem: Temp (°F)	D.O.	(mg/l)	% Saturation _	pH(S.U.) Cond.	_18	8 Grab			
INSTREAM WATERSH	ı									
FEATURES Stream Width 5.0		LOCAL WATERS								
Range of Depth 1	$\frac{1.5}{1.5}$ ft $\frac{P}{P}$	redominant Surrou Surface Mining		e: Construct	tion Fores	+				
Range of Depth Average Velocity	ft/s	Surface MiningDeep Mining	5	□ Commerc			ng			
Discharge	cfs [Oil Wells		□ Industrial		ulture	6			
Est. Reach Length		J Land Disposal		□ Row Crop	ps 🗖 Urbar	n Runoff	7/Storm Sewers			
Hydraulic Structures:		Str	ream Flow;		Çı	ream Ty	/ne:			
	Bridge Abut	ments \square Dry		ed □ Low		l Perer				
□ Island □	Waterfalls	☑ Hig				Ephe	emeral Seep			
□ Other □	Culverts									
Riparian Vegetation:		Dom. Tree/Shru	b Taxa	Canopy Cove		1	nel Alterations;			
Dominate Type:				1	sposed (0-25%)		Dredging			
☑ Trees □		Sycamore			Exposed (25-50%)		Channelization			
☐ Grasses ☐ Number of Strata	Herbaceous	Black willow Maple			Shaded (50-75%) naded (75-100%)	(1	☐ Full ☐ Partial)			
- Number of Strata		маріе		L runy Si	iaucu (73-10076)					
Substrate ☑ Est. ☐	P.C	Riffle)%	Run;	<u></u> %	Pool	90 %			
Silt/Clay (<0.06 mm)		50)				70			
Sand (0.06-2 mm)			2				20			
Gravel (2-64 mm) Cobble (64-256 mm)		50)			-	30			
Boulders (>256 mm)										
Bedrock										
Habitat				Condition						
Parameter		ptimal		otimal	Marginal		Poor			
1. Epifaunal	Greater than favorable for	70% of substrate	40-70% mix of well suited for		20-40% mix of stable habitat availability less t		Less than 20-% stable habitat" lack of habitat is			
Substrate/		and fish cover;	colonization po		desirable; substrate		obvious; substrate unstable or			
Available	mix of snags	, submerged logs,	adequate habit	at for	frequently disturbed or		lacking.			
Cover	undercut ban		maintenance of		removed.					
	other stable h	nabitat and at well and at well and at well colonization	presence of ad- substrate in the							
		., logs/snags that	fall, but not ye							
	are not new f		colonization (n	nay rate at			_			
SCOPE	transient.	10 17 16	high end of sca		10 9 8 7	6	\bigcirc 4 3 2 1 0			
SCORE	Gravel, cobb	18 17 16 ble, and boulder	15 14 1 Gravel, cobble	3 12 11	10 9 8 7 Gravel, cobble, and bou	_	Gravel, cobble, and boulder			
2. Embeddedness	particles are	0-25%	particles are 25		particles are 50-75%	1	particles are more than 75%			
		by fine sediment.	surrounded by	fine sediment.	surrounded by fine sedin	nent.	surrounded by fine sediment.			
	Layering of diversity of r	cobble provides					_			
SCORE	20 19	18 17 16	15 14	13 12 11	10 9 8 7	6	5 4 3 2 1 0			
	All four velo	ocity/depth	Only 3 of the 4	1 regimes	Only 2 of the 4 habitat		Dominated by 1			
3. Velocity/Depth		ent (slow-deep,	present (if fast		regimes present (if fast-		velocity/depth regime.			
Regime	slow-shallow shallow. Dee	v, fast-deep, fast-	missing, score missing other i		shallow or slow shallow missing, score w)	are				
SCORE	20 19	18 17 16		13 12 11		6	5 4 3 2 1 0			

4. Sediment Deposition	Little or no enlarg islands or point ba than 5% of the bot by sediment depos	rs and less ttom affected sition.	Some new in formation, n gravel, sand 5-30% of the affected; slip pools.	nostly from the control of the contr	rom sediment; n osition in	Moderate degravel, sand on old and use of the botto sediment de obstructions and bends; deposition of	d or fin- new ba m affect posits s, const modera of pool	e sediment rs; 30-50% cted; at trictions, ate s prevalent.	developme of the bott frequently absent due sediment of	material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.				
5. Channel Flow Status	Water reaches bas lower banks, and amount of channe exposed.	minimal	Water fills > available ch of channel s exposed.	> 75% o annel; o ubstrate	or <25% e is	Water fills: available chriffle substrexposed.	25-75% nannel, rates ar	and/or e mostly	Very little and mostly standing p	water preserools.	in cl nt as	nannel		
SCORE	20 19 18		15 14	13		10 9		7 6		3 2				
6. Channel Alteration	Channelization or absent or minimal normal pattern.		Some chann usually in an abutments; of channelizati (greater than be present, l channelizati	reas of the evidence on, i.e., and past 2 out rece	oridge e of past dredging, 0 yr.) may nt	Channeliza extensive; e shoring stru both banks; stream reac disrupted.	embank ictures and 40	ments or present on 0-80% of	Banks sho cement; o stream rea disrupted. greatly alt entirely.	ver 80% ch cha Instre	% of nnel am l	the ized and nabitat		
SCORE	20 19 18	17 16			12 11	10 9	8	7 6	5 4	3 2	2 1	0		
7 Frequency of Riffles	Occurrence of riff frequent; spacing riffles 5 to 7 streat Variety of habitat streams where rift continuous, bould are important.	les relatively between m widths. is key. In fles are	Occurrence infrequent; riffles divid width is bet	of riffle distance ed by st	es between ream	Occasional bottom con some habitat between rif stream wide to 25.	riffle o tours p at; dista fles div	or bend: provide ance vided by	Generally shallow ri distance b divided by than 25.	all flat ffles; p etween	wat oor riff	er or habitat; les		
SCORE	20 19 18	17 16	15 14	13	12 11	10 9	8	7 6	5 4	3 2	2 1	0		
8. Bank Stability	Banks stable; evice erosion or bank far or minimal; little future problems. affected.	nilure absent potential for	Moderately infrequent, erosion mos 5-30% of baareas of ero	small anstly heal	led over.	Moderately of bank in a erosion, hig potential du	reach h gh eros	as areas of ion	Unstable, "raw" are straight so obvious b 100% of l scars.	as frequections ank slo	uent and ugh	ly along bends; ing; 60-		
SCORE	Left Bank	10 9	8	7	6	5 ((3	2	1		0		
(LB)														
SCORE (RB)	Right Bank	10 9	8	7	6	5 ((3	2	1		0		
9. Vegetative Protection (score each bank)	More than 90% o streambank surfaction immediate riparial covered by native including trees, us shrubs, or nonwo- macrophytes; veg disruption through mowing minimal evident; almost all allowed to grow to	ces and in zone vegetation, inderstory ody setative h grazing or or not Il plants	70-90% of surfaces covegetation, plants is no represented evident but plant growt great extent half of the pstubble height	vered by but one t well- ; disrup not affe h poten c; more	y native class of tion ecting full tial to any than one-	of the poter height rema	vered lands disruption of the	by htion of bare soil d vegetatior n one-half ant stubble	been rem	nk surfation; di nk veget vegeta oved to rs or le	aces srup tation 5	covered brive of on is a has		
SCORE	Left Bank	10 9	8	7	6	5	4	3) 1		0		
(LB)	D:b4 D1	10 0	0	7	6		A.	3		1		0		
SCORE (RB)	Right Bank		8	7	6	5	4		<u> </u>	·				
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian meters; human ac parking lots, road cuts, lawns, or cr impacted zone	ctivities (i.e., lbeds, clear-	Width of ri meters; hur impacted ze minimally.	nan acti	vities have		man ac	zone 6-12 tivities have great deal.	Width of meters; li vegetatio activities	ttle or i	no ri	parian man		
SCORE (LB)	Left Bank	10 9	8	7	6	5	4	3	2)	0		
SCORE	Right Bank	10 9	8	7	6	5	4	(3)	2	1		0		
(RB)														

Total Score

-Re STREAM NAME:	each 42US		LOCA	- Sta. 129+75 (KY-21) LOCATION:						
					-Silver Creek	(Kentu	icky River)			
STATION: <i>N37-33-47</i>	DRAINAGI	E AREA (AC) -	BASI	N/WATERSHE	ED .		-Berea			
	LONG:	W84-15-08	COUN	NTY; -M	fadison USGS 7.5 TC	PO;	-регеа			
-8/31/06					-Rob Lewis, Julie					
DATE:	TIME:			STIGATORS;						
TYPE SAMPLE: □ P-C WEATHER: Nov		Macroinvertebrate			main in the 1 7 1 0					
WEATHER: Nov □		24 hours eavy rain	Has there ☑Yes	□No	rain in the last 7 days?					
			Air temper		°F. Inches rainf	all in p	oast 24 hours in			
	☑Inte	ermittent showers	<u>90</u> % (-		_			
Ø		ear/sunny								
		(mg/l)	% Saturation _	pH(S	S.U.) Cond.		97			
INSTREAM WATERSH										
FEATURES Stream Width 5.0		OCAL WATERS redominant Surrou								
Range of Depth $\frac{3.0}{.1-0}$	0.5 ft	Surface Mining		. □ Construct	ion 🗹 Forest					
Average Velocity	ft/s □	Deep Mining		□ Commerc	ial 🗖 Pastur	e/Graz	ring			
Discharge	cfs □	Oil Wells		☐ Industrial						
Est. Reach Length	□	Land Disposal		□ Row Crop	os 🗹 Urban	Runoi	ff/Storm Sewers			
Hydraulic Structures:			eam Flow;			ream T				
	Bridge Abuti						ennial Intermittent			
	Waterfalls Culverts	M High	h 🛭 Very	Rapid or Torrei	itiai u	Epn	emeral Seep			
Riparian Vegetation:		Dom, Tree/Shrul	h Tava	Canopy Cove	·r·	Chan	nel Alterations;			
Dominate Type:		Dom. Tree/Sinu	σταλά		posed (0-25%)		Dredging			
☑ Trees ☑	Shrubs	Sycamore		☐ Partially	Exposed (25-50%)	Ø	Channelization			
	Herbaceous	Grape			Shaded (50-75%)		☐ Full ☑ Partial)			
Number of Strata 1		Black willow		☐ Fully Sh	aded (75-100%)					
Substrate ☑ Est. □	P.C	Riffle 70	<u> </u>	Run;	<u> </u>	Pool				
Silt/Clay (<0.06 mm)		10)				30			
Sand (0.06-2 mm)		5/	<u> </u>				40			
Gravel (2-64 mm) Cobble (64-256 mm)		50		<u> </u>			30			
Boulders (>256 mm)		70	,		•					
Bedrock										
Habitat				Condition						
Parameter		ptimal 70% of substrate	Subor		Marginal 20-40% mix of stable ha	hitat	Poor Less than 20-% stable			
1. Epifaunal	favorable for		40-70% mix of well suited for		habitat availability less t		habitat" lack of habitat is			
Substrate/	colonization	and fish cover;	colonization po	otential;	desirable; substrate		obvious; substrate unstable or			
Available		, submerged logs,	adequate habita maintenance of		frequently disturbed or removed.		lacking.			
Cover	undercut band other stable h		presence of ad		Temoved.					
	stage to allow	w full colonization	substrate in the	form of new						
		., logs/snags that	fall, but not yet							
	are <u>not</u> new f transient.	rail and not	colonization (n high end of sca							
SCORE	20 19	18 17	15 14 1	3 12 11		6	5 4 3 2 1 0			
		le, and boulder	Gravel, cobble	, and boulder	Gravel, cobble, and bou	lder	Gravel, cobble, and boulder particles are more than 75%			
2. Embeddedness	particles are	0-25% by fine sediment.	particles are 25 surrounded by		particles are 50-75% surrounded by fine sedir	nent.	surrounded by fine sediment.			
		cobble provides	Jan Janded Oy			•				
CCOPE	diversity of n	niche space.		12 12 11	10.0.0.7		5 4 3 2 1 0			
SCORE	20 19	18 17 16	Only 3 of the 4	13 12 11	10 9 8 7 Only 2 of the 4 habitat	<u> </u>	Dominated by 1			
3. Velocity/Depth	All four velo	ent (slow-deep,	present (if fast		regimes present (if fast-		velocity/depth regime.			
Regime	slow-shallow	v, fast-deep, fast-	missing, score	lower than if	shallow or slow shallow					
SCORE	shallow. Dee		missing other	regimes) 13 12 11	missing, score w)	6	5 4 3 2 1 0			
L SCORE	LU 17	10 1/ 10	1 13 17	IN II	1 10 /	-				

4. Sediment Deposition	Little or no enlargement of islands or point bars and less	Some new increase in bar	Moderate deposition of new	Heavy deposits of fine
Deposition	than 5% of the bottom affected	formation, mostly from gravel, sand or fine sediment;	gravel, sand or fine sediment on old and new bars; 30-50%	material, increased bar development; more than 50%
	by sediment deposition.	5-30% of the bottom	of the bottom affected;	of the bottom changing
		affected; slight deposition in	sediment deposits at	frequently; pools almost
		pools.	obstructions, constrictions,	absent due to substantial
			and bends; moderate deposition of pools prevalent.	sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both	Water fills > 75% or the	Water fills 25-75% of the	Very little water in channel
	lower banks, and minimal	available channel; or <25%	available channel, and/or	and mostly present as
	amount of channel substrate is	of channel substrate is	riffle substrates are mostly	standing pools.
SCORE	exposed. 20 19 18 17 16	exposed.	exposed.	
6. Channel Alteration	Channelization or dredging	15 14 13 12 11 Some channelization present,	10 9 8 7 6 Channelization may be	5 4 3 2 1 0 Banks shored with gabion of
	absent or minimal; stream with	usually in areas of bridge	extensive; embankments or	cement; over 80% of the
	normal pattern.	abutments; evidence of past	shoring structures present on	stream reach channelized and
		channelization, i.e., dredging,	both banks; and 40-80% of	disrupted. Instream habitat
		(greater than past 20 yr.) may	stream reach channelized and	greatly altered or removed
		be present, but recent channelization is not present.	disrupted.	entirely.
SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively	Occurrence of riffles	Occasional riffle or bend:	Generally all flat water or
	frequent; spacing between	infrequent; distance between	bottom contours provide	shallow riffles; poor habitat;
	riffles 5 to 7 stream widths. Variety of habitat is key. In	riffles divided by stream	some habitat; distance	distance between riffles
	streams where riffles are	width is between 7 to 15.	between riffles divided by stream width is between 15	divided by stream width is > than 25.
	continuous, boulders or logs		to 25.	than 23.
	are important.			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of	Moderately stable,	Moderately unstable, 30-60%	Unstable, many eroded areas,
	erosion or bank failure absent or minimal; little potential for	infrequent, small areas of erosion mostly healed over.	of bank in reach has areas of erosion, high erosion	"raw" areas frequently along straight sections and bends;
	future problems. <5% of bank	5-30% of bank in reach has	potential during floods.	obvious bank sloughing; 60-
	affected.	areas of erosion.	potential daring moods.	100% of bank has erosional
3335				scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)	Right Dank 10	8 7 6	3 4 3	2 1 0
9. Vegetative	More than 90% of the	70-90% of the streambank	50-70% of the streambank	Less than 50% of the
Protection	streambank surfaces and	surfaces covered by native	surfaces covered by	streambank surfaces covered
(score each bank)	immediate riparian zone	vegetation, but one class of	vegetation; disruption	by vegetation; disruptive of
	covered by native vegetation, including trees, understory	plants is not well- represented; disruption	obvious; patches of bare soil or closely cropped vegetation	streambank vegetation is very high; vegetation has
				been removed to 5
•	shrubs, or nonwoody macrophytes; vegetative	evident but not affecting full plant growth potential to any	common; less than one-half of the potential plant stubble	
	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or	evident but not affecting full plant growth potential to any great extent; more than one-	common; less than one-half	been removed to 5
	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not	evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant	common; less than one-half of the potential plant stubble	been removed to 5 centimeters or less in average
	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants	evident but not affecting full plant growth potential to any great extent; more than one-	common; less than one-half of the potential plant stubble	been removed to 5 centimeters or less in average
SCORE	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not	evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant	common; less than one-half of the potential plant stubble	been removed to 5 centimeters or less in average
(LB)	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Left Bank 10 9	evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	common; less than one-half of the potential plant stubble height remaining.	been removed to 5 centimeters or less in average stubble height.
(LB) SCORE	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	common; less than one-half of the potential plant stubble height remaining.	been removed to 5 centimeters or less in average stubble height.
(LB) SCORE (RB)	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Left Bank 10 9 Right Bank 10 9	evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. 8 7 6 8 7 6	common; less than one-half of the potential plant stubble height remaining. 5 4 3 5 4 3	been removed to 5 centimeters or less in average stubble height. 2 1 0 2 1 0
(LB) SCORE	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Left Bank 10 9	evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. 8 7 6 8 7 6 Width of riparian zone 12-18	common; less than one-half of the potential plant stubble height remaining. 5 4 3 5 4 3 Width of riparian zone 6-12	been removed to 5 centimeters or less in average stubble height. 2 1 0 2 1 0 Width of riparian zone <6
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score each bank riparian	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Left Bank 10 9 Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-	evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. 8 7 6 8 7 6	common; less than one-half of the potential plant stubble height remaining. 5 4 3 5 4 3	been removed to 5 centimeters or less in average stubble height. 2 1 0 2 1 0
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Left Bank 10 9 Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear- cuts, lawns, or crops) have not	evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activities have	common; less than one-half of the potential plant stubble height remaining. 5 4 3 Width of riparian zone 6-12 meters; human activities have	been removed to 5 centimeters or less in average stubble height. 2
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score each bank riparian zone).	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Left Bank 10 9 Right Bank 10 9 Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear- cuts, lawns, or crops) have not impacted zone	evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	common; less than one-half of the potential plant stubble height remaining. 5 4 3 Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	been removed to 5 centimeters or less in average stubble height. 2 1 0 2 1 0 Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score each bank riparian zone). SCORE	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Left Bank 10 9 Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear- cuts, lawns, or crops) have not	evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activities have impacted zone only	common; less than one-half of the potential plant stubble height remaining. 5 4 3 Width of riparian zone 6-12 meters; human activities have	been removed to 5 centimeters or less in average stubble height. 2 1 0 Width of riparian zone <6 meters; little or no riparian vegetation due to human
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score each bank riparian zone).	shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Left Bank 10 9 Right Bank 10 9 Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear- cuts, lawns, or crops) have not impacted zone	evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	common; less than one-half of the potential plant stubble height remaining. 5 4 3 Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	been removed to 5 centimeters or less in average stubble height. 2 1 0 Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.

Total Score

		each 42DS	<u>U</u>	1,00	- Sta. 129+75 (KY-21)						
STATION: DRAINAGE RREA (AC) SANNWATERSHED	SIREAM NAME:	T		LOCA	ATION:	-Silver Creek	(Kentı	uckv River)			
DATE		DRAINAGE		BASI	N/WATERSHE		,				
DATE:	1	LONG:		COU	NTY: -M	Madison USGS 7.5 TC	PO;	-Berea			
Type SAMPLE:	-8/31/06										
		- district	MATERIAL PROPERTY AND ADDRESS OF THE PARTY AND				· · · · · · · · · · · · · · · · · · ·				
						rain in the last 7 days?	'				
P-Chem: Temp (°F) Z5 D.O. (mg/l) % Saturation pH(S.U.) Cond. Z0/4 Grab				✓Yes	□No	•					
Note		☑Inte	ermittent showers		Cloud Cover	_ °F. Inches raint	all in p	past 24 hours in			
Note	P-Chem: Temp (°F)	75 D.O.	(mg/l)	% Saturation _	pH(S	S.U.) Cond.	_2	<i>04</i> □ Grab			
Dams	FEATURES Stream Width Range of Depth Average Velocity Discharge	ft Pr .5 ft □ ft/s □ cfs □	redominant Surrou Surface Mining Deep Mining Oil Wells	inding Land Use	e: ☐ Construct ☐ Commerc ☐ Industrial	ial ☑ Pastur ☐ Silvic	e/Graz ulture				
Dominate Type:	□ Dams □ □ Island □	Waterfalls	ments 🗖 Dry	Poole		□ Normal	Pere	ennial Intermittent			
Trees			Dom. Tree/Shru	b Taxa							
Silt/Clay (<0.06 mm) Sand (0.06-2 mm) Gravel (2-64 mm) Gobble (64-256 mm) Boulders (>256 mm) Bedrock Habitat Parameter Optimal Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 25-55% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 25-55% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0	☐ Trees ☐ ☐ ☐ Grasses ☐	Herbaceous			☐ Partially ☐ Partially	Exposed (25-50%) Shaded (50-75%)	Ø	Channelization			
Sand (0.06-2 mm) Gravel (2-64 mm) Boulders (>256 mm) Bodrock Habitat Condition Category Parameter Optimal Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Substrate	P.C	Riffle 30)%	Run;	<u>%</u>	Pool	%			
Gravel (2-64 mm) Boulders (>256 mm) Bedrock Habitat Optimal Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. Layering of cobble provides diversity of niche space.			30)				30			
Cobble (64-256 mm) 30 30 30				2				40			
Bedrock Habitat Condition Category Parameter Optimal Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snages, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 Tondition Category A0-70% mix of stable habitat; babitat availability less than desirable; substrate frequently disturbed or removed. Poor 20-40% mix of stable habitat; babitat availability less than desirable; substrate frequently disturbed or removed. Providental Condition Category A0-70% mix of stable habitat; babitat availability less than desirable; substrate frequently disturbed or removed. Providental Condition Category A0-70% mix of stable habitat; babitat availability less than desirable; substrate frequently disturbed or removed. Providental Condition Category A0-70% mix of stable habitat; babitat availability less than desirable; substrate frequently disturbed or removed. Providental Colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale). SCORE 20 19 18 17 16 Tondition Category A0-70% mix of stable habitat; babitat availability less than desirable; substrate frequently disturbed or removed. Foravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. Substrate on full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate at high end of scale. SCORE 20 19 18 17 16 Tondition Category A0-70% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed			1								
Bedrock Habitat Suboptimal Suboptimal Available Cover Stable habitat are not new fall and not transient. SCORE 20 19 18 17 16 SCORE SCORE SCORE 20 19 18 17 16 Suboptimal Suboptimal Suboptimal Available Suboptimal Available Suboptimal Available Suboptimal Available Available Cover Score Score Available Avail			5.	,							
Cover Cove											
Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 Gravel, cobble provides diversity of niche space. SCORE 20 19 18 17 16 Gravel, cobble provides diversity of niche space. SCORE 20 19 18 17 16 Gravel, cobble provides diversity of niche space. SCORE 20 19 18 17 16 Gravel, cobble provides diversity of niche space. SCORE 30 19 18 17 16 40-70% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed. Score in the form of new fall into tyet prepared for colonization (may rate at high end of scale). Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 54 2 1 0 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Habitat										
1. Epifaunal Substrate/ Available Cover Mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 2 1 0 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Parameter										
Substrate/ Available Cover Co	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			i .							
Available Cover mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 2 1 0 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0							112111				
Cover undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0						· · · · · · · · · · · · · · · · · · ·		,			
stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 2 2 1 0 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 2 2 1 0 Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0											
potential (i.e., logs/snags that are not new fall and not transient. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 2 1 0 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 2 1 0 Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0		other stable h	abitat and at	presence of add	ditional						
are not new fall and not transient. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. SCORE 20 19 18 17 16 31 14 13 12 11 32 8 7 6 53 4 3 2 1 0											
transient. SCORE 20 19 18 17 16 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 1 10 9 8 7 6 Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. SCORE 1 10 9 8 7 6 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. SCORE 1 1 1 1 9 8 7 6 5 4 2 1 0 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. SCORE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1											
SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 2 2 1 0 Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.			and not								
Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. SCORE 15 14 13 12 11 19 8 7 6 5 4 3 2 1 0	SCORE		18 17 16			10 9 8 7	5	5 4 2 1 0			
2. Embeddedness particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space. particles are 25-50% surrounded by fine sediment. Layering of cobble provides diversity of niche space. particles are 25-50% surrounded by fine sediment. particles are 50-75% surrounded by fine sediment. surrounded by fine sediment.											
Layering of cobble provides diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 1 9 8 7 6 5 4 3 2 1 0	2. Embeddedness	particles are (0-25%	particles are 25	5-50%						
diversity of niche space. SCORE 20 19 18 17 16 15 14 13 12 11 1 1 19 8 7 6 5 4 3 2 1 0				surrounded by	fine sediment.	surrounded by fine sedin	nent.	surrounded by fine sediment.			
SCORE 20 19 18 17 16 15 14 13 12 11 1 9 8 7 6 5 4 3 2 1 0											
3001.2	SCORE			15 14	13 12 11	1 9 8 7	5	5 4 3 2 1 0			
All four velocity/depth Only 3 of the 4 regimes Only 2 of the 4 habitat Dominated by 1	SCORE					Only 2 of the 4 habitat	-	Dominated by 1			
3. Velocity/Depth regimes present (slow-deep, present (if fast-shallow is regimes present (if fast-velocity/depth regime.	3. Velocity/Depth					regimes present (if fast-					
Regime slow-shallow, fast-deep, fast- missing, score lower than if shallow or slow shallow are	· · · · · · · · · · · · · · · · · · ·	slow-shallow	, fast-deep, fast-	missing, score	lower than if		are				
shallow. Deep > 1.5 feet. missing other regime missing, score low) SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0	SCORE						6	5 4 3 2 1 0			

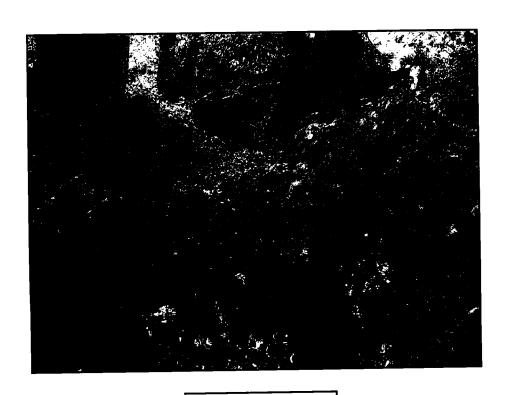
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status	20 19 18 17 16 Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	15 14 13 12 11 Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 6. Channel Alteration	20 19 18 17 16 Channelization or dredging	Some channelization present,	10 9 8 7 6 Channelization may be extensive; embankments or	Banks shored with gabion of cement; over 80% of the
	absent or minimal; stream with normal pattern.	usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	1 9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 🕥	5 4 3	2 1 0
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)	Right Dank 10 7	ů / O		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)	Might Daile 10			
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB) SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(KD)	1			

(RB)
Total Score

NOTES/COMMENTS;



Reach 16



Reach 26



Reach 42US



Reach 42DS

BEREA BYPASS WETLAND REPORT Item No. 7-192.20

Wetland A is located near STA 127+00. According to the Cowardin classification, Wetland A would be considered a palustrine scrub-shrub drain located between a field and a hillside that is inundated (PSS1C). The total area and area of impact for this project is 0.04 acres. The dominant species are *Acer negundo*, *Arundinaria gigantea*, *Lysimachia nummularia*, and *Fraxinus pennsylvanica*. The vegetation is considered hydrophytic since 100 percent of the dominant plants are facultative (FAC), facultative wetland (FACW), and/or obligate (OBL). The soil belongs to the Huntington silt loam series, which is not on the Madison County hydric soils list. The soil has a matrix color ranges from 10YR 5/2 to 10YR 5/3 and has a mottle color of 10YR 5/4 at a depth of ten to twelve inches. Low matrix chroma and mottling are hydric soil indicators. Wetland hydrology is indicated by soil inundation for an average of one inch, along with the presence of oxidized root channels, water marks, and drift lines. Wetland A drains to an unnamed tributary of Silver Creek and is located within the 100-year floodplain of Silver Creek.

Wetland B is the fringe of a pond located near Johnson Road at STA 190+00. The pond's fringe would be considered palustrine emergent wetland that is saturated (PEM1B). The total area and area of impact is 0.03 acres. The dominant species are *Polygonum punctatum*, *Leersia oryzoides*, *Bidens frondosa*, and *Juncus effusus*. The vegetation is considered hydrophytic since 100 percent of the dominant plants are FAC, FACW, and OBL. The soil belongs to the Lawrence silt loam series, which may contain inclusions of hydric soils. The soil matrix color ranges from 2.5Y 7/2 to 2.5Y 7/3 and has a mottle color of 10YR 6/8 at a depth of twelve inches. Low matrix chroma, mottling, and the presence of iron concretions are hydric soil indicators. Wetland hydrology is indicated by soil inundation to a depth of one inch, as well as the presence of oxidized root channels. Wetland B likely drains to an ephemeral tributary of Terrill Branch and is located outside of the 100-year floodplain.

Wetland C is the fringe of an isolated pond located off KY 1617 near STA 222+00. The pond's fringe would be considered palustrine emergent wetland that is saturated/inundated (PEM1B). The total area and area of impact is 0.02 acres. The dominant species are *Juncus effusus*, *Rhexia mariana*, *Typha latifolia*, and *Ludwigia palustris*. The vegetation is considered hydrophytic since 100 percent of the dominant plants are FAC, FACW, and OBL. The soil belongs to the Captina silt loam series, which is not on the hydric soils list. The soil has a matrix color of 5Y 5/1 and mottle color of 5Y 6/4 at a depth of twelve inches. Low matrix chroma,

mottling, and the presence of iron and manganese concretions are hydric soil indicators. Wetland hydrology is indicated by soil saturation in the upper twelve inches of soil and soil inundation, as well as the presence of oxidized root channels. Wetland C is located outside of the 100-year floodplain.

Wetland D is the fringe of an isolated pond located off KY 1617 near STA 224+50. The pond's fringe would be considered palustrine emergent wetland that is inundated (PEM1H). The total wetland area and area of impact is 0.02 acres. The dominant species are *Juncus effusus*, *Leersia oryzoides*, and *Sagittaria calycina*. The vegetation is considered hydrophytic since 100 percent of the dominant plants are FAC, FACW, and OBL. The soil belongs to the Berea silt loam series, which is not on the hydric soils list. The soil has a matrix color of 10YR 6/1 and mottle color of 10YR 6/3 at a depth of ten inches. Low matrix chroma and abundant mottles are hydric soil indicators. Wetland hydrology is indicated by soil inundation to a depth of several inches. Wetland D is located outside of the 100-year floodplain.

Wetland E is a low spot in a farm field off KY 1617 near STA 250+50. The area would be considered palustrine emergent wetland that is saturated (PEM1B). The area of impact is 0.2 acres. The dominant species are *Eupatorium coelestinum*, *Cyperus strigosus*, *Diodia virginiana*, *Echinochloa crusgalli*, and *Vernonia noveboracensis*. The vegetation is considered hydrophytic since 80 percent of the dominant plants are FAC, FACW, and OBL. The soil belongs to the Lawrence silt loam series, which may contain inclusions of hydric soils. The soil has a matrix color of 2.5Y 6/2 and mottle color of 2.5Y 6/4 at a depth of twelve inches. Low matrix chroma, mottling, and the presence of iron concretions are hydric soil indicators. Wetland hydrology is indicated by soil saturation to the surface. Wetland E drains to an unnamed tributary of Silver Creek and is located outside of the 100-year floodplain.

Wetland F is a pond located off KY 1617 near STA 253+00. The pond, which is covered in duckweed, and vegetated fringe would be considered palustrine emergent wetland that is inundated (PEM1H). The total area and area of impact is 0.02 acres. The dominant species are *Lemna minor*, *Typha latifolia*, *Sagittaria calycina*, and *Polygonum punctatum*. The vegetation is considered hydrophytic since 100 percent of the dominant plants are FAC, FACW, and OBL. The soil belongs to the Lawrence silt loam, which may contain inclusions of hydric soils. The soil is gleyed and has a matrix color of N 4/0 at a depth of ten inches. Low matrix chroma and gleying are hydric soil indicators. Wetland hydrology is indicated by soil inundation to a depth of several inches. Wetland F drains to an unnamed tributary of Silver Creek and is located outside of the 100-year floodplain.

Wetland G is a low spot in a farm field off KY 1617 near STA 265+00. The area would be considered palustrine emergent wetland that is saturated (PEM1B). The area of impact is 0.09 acres. The dominant species are *Juncus effusus*, *Cyperus strigosus*, *Echinochloa crusgalli*, and *Xanthium strumarium*. The vegetation is considered hydrophytic since 75 percent of the dominant plants are FAC, FACW, and OBL. The soil belongs to the Lawrence silt loam series, which may contain inclusions of hydric soils. The soil has a matrix color of 2.5Y 7/2 and mottle color of 2.5Y 6/4 at a depth of twelve inches. Low matrix chroma, mottling, and the presence of iron concretions are hydric soil indicators. Wetland hydrology is indicated by soil saturation in the upper twelve inches. Wetland G drains to an unnamed tributary of Silver Creek and is located outside of the 100-year floodplain.

Wetland H is an isolated pond located near the intersection of KY 1617 and Shortline Road at STA 281+75. The pond's fringe and vegetated interior of the pond would be considered palustrine scrub-shrub wetland that is saturated (PSS1B). The total wetland area and area of impact is 0.03 acres. The dominant species are *Juncus effusus*, *Salix nigra*, *Ludwigia palustris*, and *Carex* sp. The vegetation is considered hydrophytic since 100 percent of the dominant plants are FAC, FACW, and OBL. The soil belongs to the Captina silt loam series, which is not on the hydric soils list. The soil has a matrix color of 5Y 6/1 at a depth of twelve inches. Low matrix chroma and mottling are hydric soil indicators. Wetland hydrology is indicated by soil saturation to the surface, along with the presence of oxidized root channels and water-stained leaves. Wetland H is located outside of the 100-year floodplain.

Wetland I is a low spot in an unmaintained field off KY 21 near STA 119+00. The area would be considered palustrine emergent wetland that is saturated (PEM1B). The total area and area of impact is 0.05 acres. The dominant species are *Leersia oryzoides*, *Scirpus atrovirens*, *Fraxinus pennsylvanica*, *Diodia virginiana*, and *Carex frankii*. The vegetation is considered hydrophytic since 100 percent of the dominant plants are FAC, FACW, and OBL. The soil belongs to the Lawrence silt loam series, which may contain inclusions of hydric soils. The soil has a matrix color of 2.5Y 6/3 and mottle color of 2.5Y 6/4 at a depth of twelve inches. Low matrix chroma, mottling, and the presence of iron concretions are hydric soil indicators. Wetland hydrology is indicated by soil saturation to the surface and areas of inundation. A connection to the adjacent roadside ditch was not found, therefore, the wetland area may be considered isolated. Wetland I is located outside of the 100-year floodplain.

Wetland J is a drain off KY 21 near STA 124+50. The area would be considered palustrine emergent wetland that is saturated (PEM1B). The total area and area of impact is 0.01 acres. The dominant species are *Leersia oryzoides*, *Polygonum lapathifolium*, *Salix nigra*,

and *Eupatorium coelestinum*. The vegetation is considered hydrophytic since 100 percent of the dominant plants are FAC, FACW, and OBL. The soil belongs to the Captina silt loam series, which is not on the hydric soils list. The soil has a matrix color of 2.5Y 6/4 and mottle color of 2.5Y 6/2 and 2.5 Y 6/5 at a depth of twelve inches. The texture is clayey and contains some sand. The matrix chroma is not low enough to be a hydric soil indicator, but this area likely stays saturated long enough during the growing season to develop hydric soils. Wetland hydrology is indicated by soil saturation to the surface and areas of inundation. Drainage from the surrounding area drains through this wetland to the roadside ditch. Wetland J is located outside of the 100-year floodplain.